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IMPROVED SURFACE CONDENSER AND HEAT RECLAIMER.

This invention, patented Aug. 16, 1859, embodies the final result of a series of experiments, extending over a period of six years, in which every detail is embraced necessary to render it a complete apparatus for saving the heat and water, at present wasted, in the escape steam of every form of high and low pressure engine.

It consists in the use of a series of metallic steam chambers, communicating at each end with annular chambers—one to receive the escape steam from the engine and the other to receive the water of condensation. These parts are in connection with a rotary fan and air and force pumps, whereby the effective power of the engine is increased, the boiler supplied with pure water and the furnace with a requisite amount of hot-air, the formation of smoke prevented and a perfect combustion of the fuel obtained.

In Figs. 1 and 2, A represents a series of narrow wedge-shaped steam chambers, firmly riveted at their edges and countersunk alternately on either side, so as to prevent them from collapsing during the formation of a vacuum within, and joined at each end with the annular chambers, B and C. The chambers, A, are placed radially between the chambers, B and C, and at such a distance apart as to allow spaces, *a a*, between them, which are of equal width. The chambers, A, communicate with the peripheries of the chambers, B and C, by malleable iron connecting joints, *b*, as shown in Fig. 1, extending inward so as to admit of the air space, D, commencing at the upper part of the chamber, C, the opening in which is closed.

Between the two chambers, B and C, and all around the outer edges of the chambers, A, wooden bars, D′, are placed. These are so placed that a bar will be directly opposite each space, *a*, and at such a distance from the outer edges of the chambers as to form curved induction passages, *d*, to the spaces, *a a*, as shown in Fig. 2. E E represent pipes which conduct the escape steam from the engine into the chamber, B. F F represent pipes which conduct the water of condensation from the chamber, C. To the upper portion of the chamber, B, a pipe, G, is attached, and communicates with the air-space, D. This pipe enters the fan-box, H, at two opposite sides, as shown in Fig. 2. The box, H, is provided with two eduction pipes, *e e*, one of which conducts the air above and the other below the grate of the furnace.

Its operation is as follows:—The apparatus is placed in any position convenient to the engine and boiler or other furnace, the fan is rotated by any proper means, and a suction produced through the pipe, G, air-space, D, and spaces, *a a*, between the chambers, A, as indicated by the arrows in Fig. 1. The pipes, E E, conduct the escape steam from the engine into the chamber, B, the steam passing down into the chambers, A, which have been previously exhausted by the air pump, in which it is instantly condensed by the rapid current of air passing through the spaces, *a a*, into the air-space, D, which air, coming into contact with the steam-receiving chambers, A, becomes intensely heated and is drawn up into the fan-box, H, and discharged therefrom through the pipes, *e e*, above and below the grate of the furnace; the furnace being closed so that no air can pass into it, except what is heated by the apparatus and ejected into it by the pipes, *e e*. The wooden bars, D′, divide the air as it enters the spaces, *a a*, and serve to render it uniform, as also to prevent any radiation of heat from the outward edges of the chambers, A. The water of condensation is conducted from the chamber, C, by the pipes, F, and, by means of an ordinary force pump, is returned to the boiler for continuous use.

The inventor says:—"In a recent experiment, air was heated by this apparatus to a temperature of 182°, the water of condensation indicating 195°, and effecting an economy of fuel in anthracite coal of 45 per cent, while a saving as great as 63 per cent has been made in a furnace where bituminous coal was used.

"Independently of its use as a means for supplying furnaces with hot air, it may be employed for drying purposes in printing-offices, hat manufactories, tobacco factories, &c., being more economical and efficient for this purpose than any apparatus now in use.

"Among the advantages gained to the steam engine by its use, may be enumerated the following:—1st, A vacuum is produced, by which the power of the engine is rendered more effective. 2d, The escape steam is perfectly condensed, and thus the boiler is always supplied with pure water, entirely avoiding incrustation and rendering it absolutely secure from explosion. 3d, The furnace is supplied with hot air to the exclusion of cold, and by this means the gases of the coal are more perfectly consumed, smoke avoided, and a saving of more than one-half of the fuel effected."

Patents for this invention have been secured in France and England, through the Scientific American Patent Agency. For further particulars, the sale of State rights and licenses, address Addison C. Fletcher, Cincinnati, Ohio.

Fig. 1

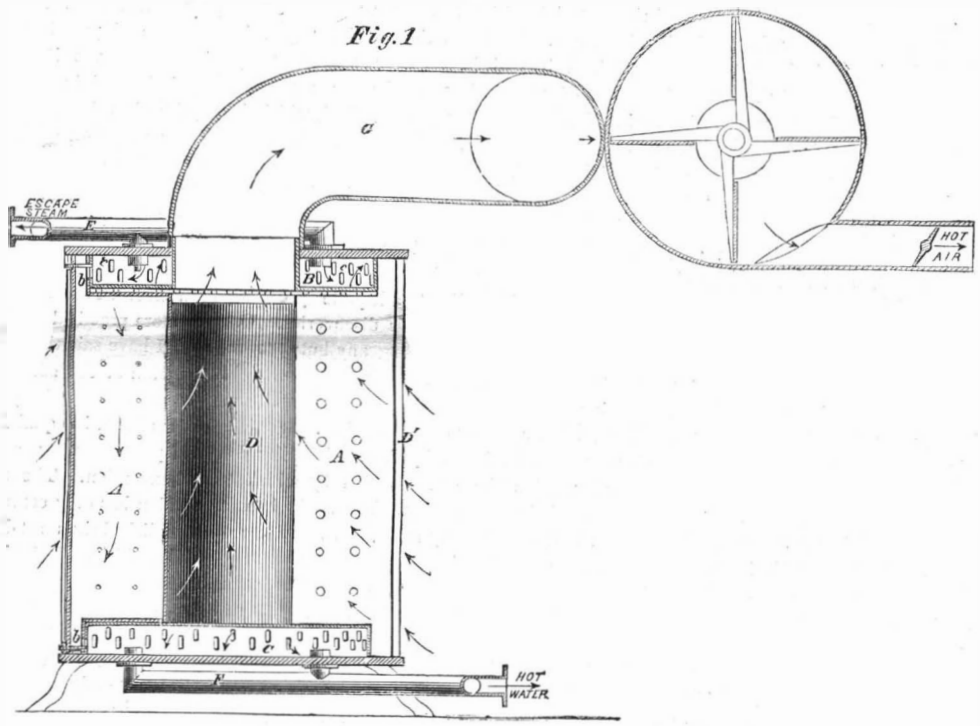
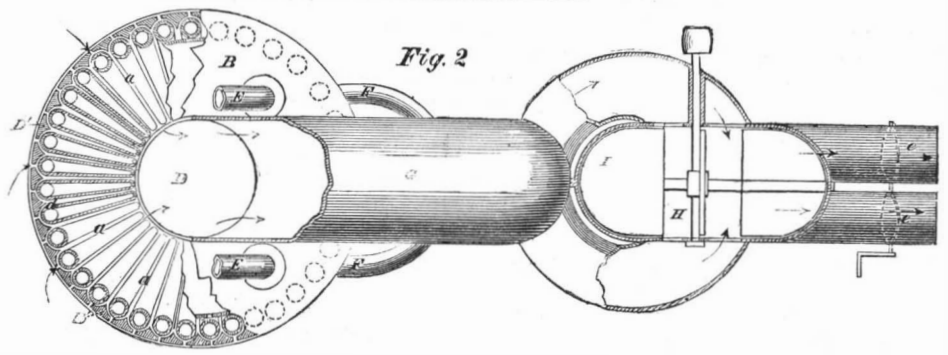


Fig. 2



FLETCHER'S SURFACE CONDENSER AND HEAT RECLAIMER.

ICE MADE IN A DRAWING-ROOM.

—The operative chemists sell small glass vessels which are called test tubes; they are of thin glass, and hold from one to four drachms, and are very useful for the purpose of trying small experiments. The following is a simple and singular method of freezing water. Ask mamma to lend you a jam jar, fill the same with powdered sulphate of soda; now pour on the saline material as much muriatic acid as will render it semi-fluid, then fill a test tube with water as cold as you can procure, and put it into the center of the chemical mixture; let it remain at rest for 10 minutes or so; finally take out the tube and wipe it dry; you will find the water frozen. To get the ice out of the tube dip the latter for a few seconds into warm water, invert it, and the cylinder of ice will then fall into your hand.—*Septimus Piesse.*

PIN-MONEY.

—Towards the close of the fifteenth century, an epoch that marks a transition style in the dress of ladies, pins were looked upon with great favor as New Year's gifts. They displaced the old wooden skewer, which no effort of skill, no burnishing or embellishment, could convert into a sightly appendage. Pins, in that simple age of the world, were luxuries of a high price, and the gift was frequently compounded for in money—an allowance that became so necessary to the wants of ladies of quality, that it resolved itself at last into a regular stipend, very properly called "pin-money."

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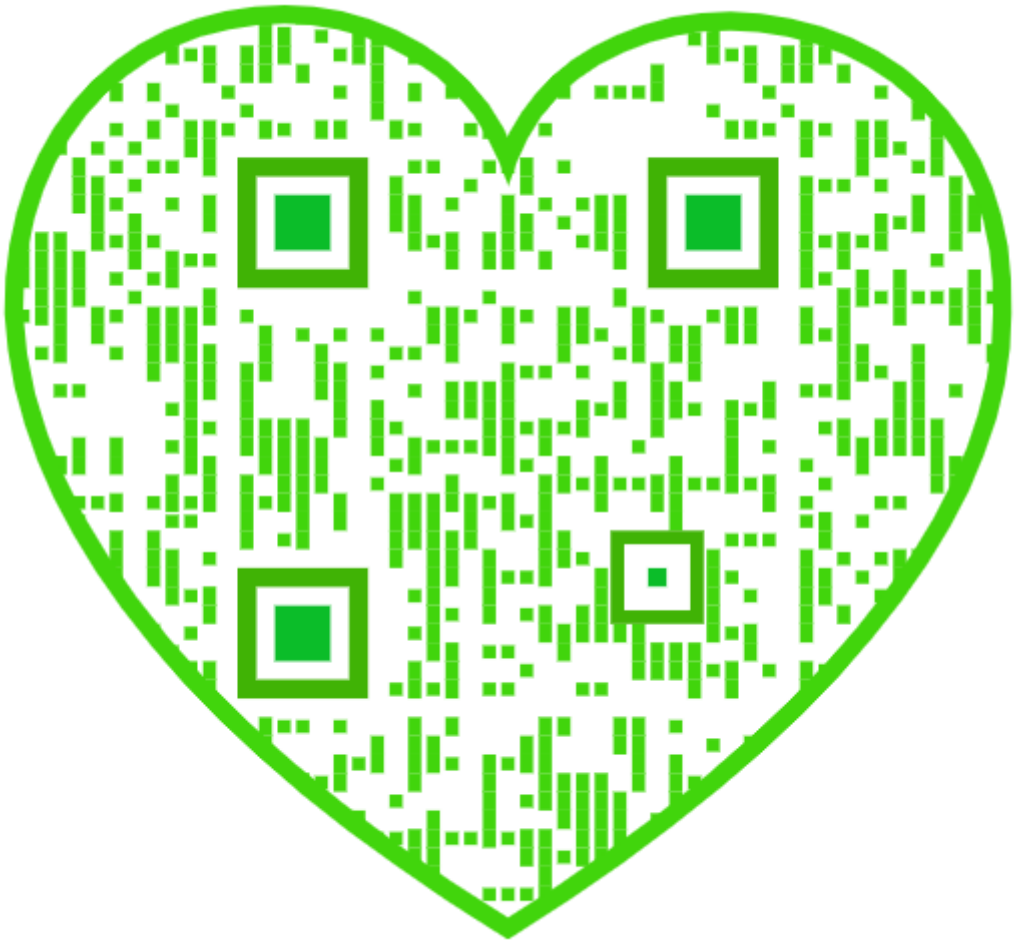

THE MORSE TELEGRAPH EXTENSION CASE.

ARGUMENT OF HON. CHARLES MASON.

An erroneous impression seems to prevail to some extent in relation to this matter. One of our cotemporaries states that this patent had been previously extended twice. This is wholly incorrect. The patent was granted in 1846, and was never until now extended.

In 1840, Morse obtained a patent for his first invention. That patent was extended for seven years in 1854, and will expire in June, 1861. But the invention then patented, though inestimably valuable in comparison with anything previously known, and although it contained the germs of all its subsequent developments, was clumsy and of little worth when compared with the telegraph as now in operation. Before it was ever put in practice, Morse had made the improvements which perfected the instrument, and made it not only the first but also the most valuable of all the electro-magnetic telegraphs ever invented. Those improvements constitute the basis of his patent of 1846, which has just been extended for seven years.

The two patents were then constituent parts of one entire whole. Both were necessary to make the telegraph what we now see it. This of 1846 had never been used separately, and the Commissioner decided that it was meet and proper that both should be treated alike, and that this, as well as the other fraction which together make up the whole invention, should receive the favor of the Office in the method provided by law. The public voice, with few and slight exceptions, will approve the action of the Commissioner. Believing it will be interesting to our readers to learn something more of the reasons which were presented to the Commissioner, and which doubtless in some degree influenced his decision, we append hereto a portion of Judge Mason's argument in the case, the substance of which was subsequently prepared and printed in pamphlet form. After showing in what the invention patented in 1846 really consists, that it was patentable, eminently useful, and that the inventor had not been adequately compensated, the argument proceeds:—

"But we are told that, although Morse's invention may be sufficient to sustain his patent, it amounts to but little, after all; that the battery, the conducting wires, the magnets, and the contrivances for breaking and closing the circuits were not only well known separately, but that they had been previously used in combination.

"This is all true; but what then? It only amounts to this: that certain principles and contrivances were previously known, of which Morse availed himself, in giving to humanity a new and most valuable faculty—that of speaking at a distance. A new power of nature had been discovered, which was most curious and surprising. Morse gave that new and hitherto dumb agent the power of speech. He subjugated it to his will, and it became one of the most reliable and submissive servants of man. The *Ariel* of the drama has almost ceased to be a poetic fiction, and is becoming a reality, with powers in some respects far surpassing the most fertile imaginings of the poet.

"Suppose none of the brute animals had ever been taught to labor—that they only existed in wild untutored harmlessness to excite the wonder of the curious, or to figure in the descriptions of the naturalist. If then some Morse should arise on this side the Atlantic, who, after years of patient toil, privation and discouragement, should finally discover the means of subjecting the ox to the yoke and the horse to the harness and the saddle, what man, especially what American, with head and heart aright, would hesitate to acknowledge the greatness of the boon that had thus been conferred upon the human race? And when the general voice of the world was recognizing the debt of gratitude which was due to this discoverer—when kings and emperors were paying homage to his genius, and were vieing in a spirit of voluntary justice to crown him with distinction and with honors, and even with more substantial marks of favor—when the pharisaical pride of the Old World had yielded, and the jealous prejudice of her tyrants and her aristocrats had been forced to admit that something new and good had in fact come out of this republican Nazareth, would some of our O'Reillys or our Eddys be found willing to appear before your Honor on an occasion like this, and suggest that this supposed Morse was entitled to but little credit after all—that he had not created or even first discovered either the ox or the horse? It would be easy for them to show that these very animals had previously existed; that they always had eyes and ears and muscles, and powers of being useful, as well before as since their being thus domesticated and subjugated.

"We do not profess to have created or discovered this wonderful agent, but we do lay claim to the credit of having first put it in harness and caused it to do our bidding—to speed our messages of love, or to carry the tidings of woe—to hasten or to stay the movements of an army—to arrest the criminal or to give warning of the conflagration—to enable the rail-car, with its priceless burden, to move with safety, or to stop its progress when leading to inevitable destruction—and finally, to give the man-of-business the means of doing in one day more than he could otherwise accomplish in ten, thus lengthening out his life in that proportion, so far as it is to be reckoned by events rather than by years.

"These are some of the benefits we claim to have conferred upon the world. And when the history of this wonderful discovery shall hereafter be written—when Morse shall be placed by posterity alongside of the greatest of human benefactors, I trust your Honor will be found among the number of those who recognized and appreciated the magnitude and inestimable importance of this new power with which he has endowed our common humanity.

"I have no disposition to detract in the least from the merit of those men-of-science who have furnished so many of the materials which have been used by Morse and other inventors. To them the world owes an infinite debt, which it will hardly ever attempt to pay. The discoverers of philosophical truths are constantly conferring inestimable benefits upon mankind, which deserve our warmest gratitude, and should receive some more substantial reward.

"But under our system of government, with the notions now entertained by our legislators and our people, such a result is hardly practicable. The mathematician, the chemist, the naturalist, or other man-of-science must rely on something besides direct, adequate pecuniary compensation for his labors and his discoveries. Our laws make no provision for rewarding any but the *inventor*. That we cannot in that manner compensate the former class is no reason why we should hesitate to do so to the latter when a proper occasion arises.

"Nor is the amount of ingenuity or of originality displayed by an invention the sole criterion by which to measure this intended compensation. Where the benefit conferred upon the public is very great, the smallness of the amount of the invention is no obstacle to our recognition of the merits of the inventor, nor to the pecuniary reward which he will be permitted to reap therefrom.

"Tried by the standard suggested by the contestants in this case, even the art of printing, the most useful and wonder-working invention that has been made within the historic period of the world, would be of trifling moment. The Chinese practiced a species of printing long before the Christian era. The idea of types for stamping or printing letters or words, or even sentences, was not new. Signet rings have been used for thousands of years. Seals, by which the unlettered barons of Europe affixed their names to written instruments, and even pictures engraved on plates, with texts of Scripture attached, with a view of having the impression transferred to paper by printing, were known and practiced long before the time of Guttemberg.

"What, then, did he invent? Simply the preparation of type in separate letters, which might be prepared in quantities arranged in words at the pleasure of the compositor, and then struck off into thousands of copies of books, and pamphlets, and newspapers.

"Analyzed by the chemistry attempted to be applied to this case, the invention of Guttemberg would seem a very small matter, and yet how it has changed the whole face of the world! Not only has literature been made to feel its effects, but also the sciences and all the arts of civilized life. All the institutions of mankind, civil, political and religious, have been shaped and changed under the wizard touch of this poor German inventor. And yet, if he himself could now arouse from his slumber of four centuries, and appear in this presence, and if your Honor were constituted the appropriate organ to express in some suitable way the public appreciation in regard to the utility of his invention, would he not be met by the present contestants with a protest against any substantial recognition of the value of his invention? To doubt this would be to cast an insinuation upon the disinterestedness of the motive which now brings them here. The same patriotic and unselfish desire to prevent an excess of public gratitude would operate just as strongly, and with the same result, in that case as in this.

"But to come nearer to our own time and country. What has rendered the name of our own Fulton immortal? He did not—as, in my childish ignorance, I once supposed—invent the use of steam as a motive power. He was not the first even to apply that power to the propulsion of boats. John Fitch, and perhaps some others, were many years his predecessors in that effort.

"What, then, did he do? Little else, in fact, than to attach a wheel to the boat as a simpler and more practical means of propelling it. The wheel so attached was substantially the same as that which had long been used as a common water wheel to propel machinery, and Fulton merely placed the moving power at the other end of the apparatus. Instead of providing for the water to strike upon the wheel, he proposed to cause the wheel to strike the water, and then availed himself of the result.

"Fitch provided the means of moving by steam a series of side paddles, something after the manner in which an Indian paddles his canoe. He succeeded in running some five miles an hour, which is quite as much as Fulton accomplished in his earlier efforts.

"But Fulton had conceived the idea of a simple, strong and practical contrivance for the propulsion of boats—one not liable to be deranged and inefficient. And although in recent times the contrivance proposed by him has been to a great extent superseded by the screw propeller, still to this day he is justly regarded as the father of steam navigation. He paved the way to the most brilliant success; and if he was now here asking a recognition of his merits, which it was in the power of the Commissioner of Patents to grant, can there be any doubt as to what would be the result? Has Fulton invented more than Morse? Has his invention been of more practical utility to the world?

"I have said that Fulton did little else than use a combination of the common steam engine and the common water wheel for the propulsion of boats. This observation should be qualified. He also exerted the energy and perseverance necessary to carry his idea into practical execution. The man who has made a valuable invention has only commenced his labor. He has not accomplished the most difficult and disagreeable part of his undertaking. It is the policy of the law to compel him to bring it into public and general use. This often calls for rarer qualities than are necessary in making the invention itself. The fortitude which no difficulties can appall—the faith which no discouragement can change into doubt—the firmness and energy which even poverty and derision can never induce to abandon the great idea which urges him forward as with the power of inspiration to its consummation—these were the crowning glory of Fulton. They were equally conspicuous in Morse.

"Without these qualities, no talents will secure success. For the want of them, how many of the noblest plans and inventions have wholly failed! To call them into effectual exercise is a leading purpose of the patent laws, which hold out the prospect of pecuniary profit as dependent upon the effectual introduction of every invention into public and general use.

"How pre-eminently these qualities evinced themselves in the life and history of Professor Morse, your Honor will perceive by referring to the testimony. After the great idea had possessed his mind in 1832, how entirely were all the energies of his soul and body bent upon its final consummation! Laboring at his profession for the sole purpose of obtaining the means of perfecting his invention—purchasing his food at a provision store, taking it home at night and preparing it in his room, in order to economize the scanty means thus provided, surely, if he had proved unsuccessful he would have been justly regarded as monomaniac. In proportion to these efforts and sacrifices—in proportion to the obloquy of a failure, should be the splendor and the reward of his final success.

"And then, at a later day, when his invention, though still imperfect, had begun to assume more body and shape, we see him urging his plans upon the attention of

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the incredulous; presenting his ideas before the learned bodies of this and other countries; submitting to all the unpleasantness of soliciting from Congress the means of testing the truth of his great idea; bestowing one-sixteenth of his invention upon one friend for scientific aid, one-eighth on another for pecuniary assistance, and one-fourth upon one whom he supposed a reliable agent agent and coadjutor, in order to secure his services. And when disappointed in this supposition we find him practically giving one-third of all that remained to secure the necessary services of another counselor and agent in whom he could confide. Everything else was made subservient to his one great idea of securing this invention, and successfully introducing it into general use. In this endeavor he has at last been eminently successful. But the effort has required nearly all the gross receipts resulting from the invention, and he now presents himself before your Honor, claiming that under the laws of his country he is fairly entitled to the boon he now asks. If ever an inventor could fairly claim an extension of his patent, that man is Professor Morse, in the present instance.

"But we are told that we have treated this subject as though the whole invention of the telegraph were the work of Professor Morse alone, whereas there are several modes of telegraphing without a resort to either of the contrivances patented by him. The evidence shows that nearly all the telegraphs now in existence are working under the Morse patents.

"But suppose the case were different, and that the 'House' and the 'Bain' telegraph, or those of any one else, were equal to Morse's, and were no infringements of his patents. Or suppose the mode of telegraphing by sound can be practiced without infringing upon any patent, and that it was common property, and superior to any other mode of telegraphing; does it not follow that the contestants have no reason to object to this extension? The patent, if extended, will stand in no one's way, and all that has been said against the mischiefs which will thence result falls to the ground.

"But I am altogether of a different opinion in relation to the scope of Morse's patents. At all events, if those *patents* are not broad enough to render these and other contrivances for telegraphing infringements, the *inventions* themselves are so, and such I believe to be the opinion of the contestants as evinced by their conduct.

"I know the eighth claim of the re-issued patent of 1840 has been held by the Supreme Court (four judges against three) to be invalid, as being too broad. This claim is to the use of the motive power of electro-magnetism, *however developed*, for marking or printing intelligible characters, signs or letters at any distance.

"If it were ever proper to question the decision of that august tribunal, it would be in cases like this, where there was a bare majority of one in favor of that decision, and where the dissenting judges were sustained by such a logical and powerful argument as that presented by Judge Grier in this case. (See 15 Howard, 124.)

"But without intimating a doubt on this subject, it will not be improper to suggest that this decision merely declares the eighth claim to be invalid—not that a different claim would be so, which was still sufficiently broad to render these and other modes of telegraphing all infringements.

"Columbus was the discoverer of this continent, though he may not have seen it at but one single point, or known what was beyond or around on any side. Multitudes of followers made discoveries, but all were subordinate to that of the great Genoese. They availed themselves of the information which he had given. They followed in his footsteps. Give them each the merit which is his due, but let none of them be placed on a level with the 'Old Admiral' himself, nor lay claim to any right as an independent original discoverer.

"Morse was the Columbus of the telegraph. Like his prototype he launched boldly forth into the chartless ocean which separated the known from the unknown. He has not given to mankind a new world, but he has given to the old world a new property. The earth itself is changed, and has a nervous system spreading all over its surface. Human nature is not what it was before this discovery. Let no second Americus succeed in robbing him of his just glory! Let the subsequent discoveries of no Cabots or De Sotos or Hudsons attempt to elevate themselves to an independence of the great original!

"Does any one doubt that the discoveries of Morse led the way to those of his followers as much as did that of Columbus? Have they not pointed out and suggested to House and Bain, and the inventors of telegraphing by sound, the track they were to pursue, as much as did a knowledge of the existence of this continent render that of the valleys of the Mississippi or the Hudson, or even all North America, a secondary discovery. The rule is founded on reason, and the same principle runs through both cases.

"I insist, then, that Morse is the first inventor of the electro-magnetic telegraph generally—that all the subsequent inventors have followed in his footsteps—have availed themselves of the benefit of his discoveries, and are therefore rightfully subordinate to him; and that, in estimating the value of his invention, it is therefore proper to take into consideration the entire value of the whole magnetic telegraph.

"What though his patent was so framed that it might be evaded by subsequent inventors? It is not the value of Morse's *patents*, but the value of his *inventions*, that we are now considering. The law which authorizes these extensions (act of 1836, sec. 18) contemplates that they shall be granted when the patentee has "failed to obtain from the use and sale of his *invention* a reasonable remuneration for the time, ingenuity and expense bestowed upon the same." If, therefore, Morse's invention was really such that the others were properly subordinate to it, he is entitled to be considered as the inventor of the whole, whatever be the nature of the patents granted to him, and should e treated accordingly. As he has not been adequately remunerated, we claim that the extension now sought should be granted to him.

"But I am willing to admit that this patent will limit, to some extent, the rights and privileges of others. This is one of the necessary consequences of the institution of property of any description. Your house or your farm is a monopoly. Others have no right to take possession of them without your permission, however convenient or agreeable it might be to them to do so. It would be just as convenient for the builder of a new line of telegraph to seize upon the necessary wire or other material, without payment, as to use Morse's invention upon the same terms.

"There is one school of French philosophy which is founded upon the maxim that all property is robbery; and there are many persons in all countries to whom the idea of a community of property, or a general division every Saturday night, would seem agreeable, at least, if not proper. But the general voice of the civilized world, in all ages, has been decidedly in favor of this species of monopoly—of giving to every man the exclusive enjoyment of all that his labor, his economy, his talents, or his good fortune has secured. This idea is the parent of industry, of frugality, of public and private wealth, of general improvement and progress, of civilization itself. The savage, who has no idea of property in real estate, cuts down the tree for the sake of the fruit; he never sows, for others would reap; he never saves, for others would enjoy.

"Now, if there is any species of property to which, in preference to all others, one has a natural right, it is that which he himself has created. That which, but for us, would have had no existence, is more clearly ours than that which has become ours by mere transfer. Our natural right to our children is therefore superior to that which we can justly claim in our servants. Is not a creation of the mind as clearly ours as a creation of the hand? He who gives existence to an art, that but for him would never have been known, has a natural right of property therein, as much as he would have in a house built entirely of his own labor. The one is no more a monopoly than the other.

"But we are told that this invention of the telegraph would soon have been made, had Morse never lived; that other minds in this country and in Europe were busy with this general idea, which had ripened into various inventions before the knowledge of Morse's contrivances had been given to the world, and that these subsequent inventors (being really original) have the same natural rights in their creations as Morse has in his. So the nations whose respective navigators have each discovered the same island, hitherto unknown, may all be said to have the same ground for claiming it by right of discovery. But, by the well-settled rule in such cases, the first discoverer has a perpetual preference, however small the space of time by which his priority is determined. In all these cases, some one must be preferred; and, where the equities are equal, he who is prior in time has a superiority in title.

"The fact that the same invention would probably soon be made by another is the chief justification for refusing to any inventor the *perpetual* enjoyment of the fruits of his own genius. If it were certain that but for Morse the invention of the magnetic telegraph would never have been made, his patent title should never have been limited, but should have descended to his children to the latest posterity.

"The ground taken by some for justifying such a limitation is, that the government may rightfully require the abandonment of this species of property, after a certain number of years, as a consideration for its protection during that period; but this is hardly a solid foundation on which to ground this right. Does the law protect property in a patent any more than in a horse or in a plantation? Experience demonstrates the deplorable fact that such protection is vastly less effectual in the former case than in the latter.

"It is the duty of the government to secure us in the enjoyment of our property of every description. This is one of the cardinal purposes for which it is organized, and it has no right, *merely* on account of this protection during a certain number of years, to require its confiscation to public use forever afterwards.

"But, inasmuch as many persons may be the original inventors of the same thing, and may thus all have a just claim to its enjoyment, the law gives to the first inventor the exclusive property therein for 14 or 21 years. During that time, it is as much his own as any species of tangible property. The title is quite as just, and there is no more of a monopoly, within the objectionable meaning of that term, in the one case than in the other.

"Away, then, with this agrarian idea of taking away the rights of an inventor, merely because it would be convenient and pleasant for others to enjoy the fruits of his labor, his ingenuity and his perseverance! It is the argument of the brigand; it is the justification of the robber!

"I am aware that there are some inconveniences growing out of the existence of patents for inventions; and, accordingly, many men of just minds have been in favor of giving to each inventor a pecuniary equivalent for his property, and then dedicating it to public use. But the difficulty of awarding a just equivalent for an untried invention, and, still more, the utter impossibility of satisfying the expectations of an exorbitant and often morbid estimate generally found to exist in the mind of every inventor, would render every scheme of that nature altogether impracticable. The inventor is therefore given the exclusive use of his invention for a limited time, that he may test its merits, and derive a compensation therefrom proportional to its value and its utility to the public.

"I need not discuss the justice and expediency of this policy on the present occasion. It is enough that it has been adopted by the country, and is interwoven with all its interests. Its foundation is laid in that great instrument which has made us a nation. It early became the subject of favorable legislation by Congress. A bureau was created, and this magnificent temple of art has been erected for its accommodation.

"The records of this Office exhibit the result of this policy. The protection it has afforded to inventors, imperfect as it has been, has communicated an impulse to the inventive genius of our fellow-countrymen, which is increasing from year to year in a rapid geometrical progression. The number of patents annually applied for in this Office is greater than in any other country on earth. Nowhere else are the energies of the human mind so thoroughly aroused. Every field of human exertion is carefully explored. Automatic machinery is taught to do, in an expeditious and perfect manner, the labor which once required the constant guidance of the most practiced skill and the most sleepless intelligence. Ends are attained which were formerly beyond the reach of any human effort, however untiring or energetic. The deep secrets of nature have been extracted from their darkest recesses, and man is constantly rising to a new and higher order of being.

"Over this auspicious, this wonderful transition, you, sir, have been called to preside. The author of the most useful and astonishing invention ever recorded in the annals of this Office has placed himself before you, to ascertain what favor the meritorious class to which he

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belongs may expect to receive from this great center around which they all revolve. I submit his case, confident that the liberal and enlightened views which have caused the establishment and continuance of this institution, and which have given it all its efficiency, will still be continued in its administration."

PREVENTION OF SCALE IN BOILERS

Wherever salt or hard water is employed for the feed of steam boilers, a scale of sulphate and carbonate of lime is usually formed on the metal, which prevents the conduction of heat to the water, and thus causes a great waste of fuel. The Croton water, of this city, deposits a scale of about one-fourth of an inch in thickness, in three months, in a boiler which is in constant use; while, in other sections of the country, where the water is "harder," a much thicker incrustation is formed in the same period of time. Many substances have been employed, with more or less success, for preventing the adherence of this scale. We were lately invited to examine the condition of the boilers used in the *Daily Times* printing office, in which a newly-invented substance to prevent incrustation has been in use for some time. It consists of a chemical compound (manufactured by Chester, Clark & Co.), which is fed into the boiler in small quantities, and seems to protect the surface of the metal in such a manner that it prevents the adhesion of all deposits. The boiler which we examined had been used for about 10 months without being cleaned out; yet the tubes, joints and crown sheet were clean and smooth as Russian iron. The engineer (Mr. Wm. P. Clawsen) assured us that this chemical compound not only prevented the formation of new incrustations, but removed old scale. Many substances—such as strong astringents and sal-ammoniac—that have been used to remove scale, act chemically upon the metal, and injure it, which is a strong objection to their employment for such a purpose. We examined the tube joints of the *Times'* boiler in search of evidence for chemical action on the iron with this scale-preventive, but found none. From the character of the class of manufacturers who are using this compound (a list of a portion of whom may be found in our advertising columns), in connection with what we saw of the boiler in the *Times'* press-room, we are led to the opinion that this is one of the best articles which has been discovered for curing a very severe difficulty experienced by almost every person who has the care of steam boilers.

AERIAL CHARIOTS DRAWN BY EAGLES.

MESSRS. EDITORS:—In our days of fast traveling and extraordinary enterprises, I wonder that the bold idea enunciated in the following quotation (from the eleventh lecture of Dr. Good's "Book of Nature") has not yet been acted upon. I transcribe it for the benefit of ambitious aeronauts, or for the curious and speculative. Certain it is, that the Yankee who first starts a line of aerial coaches drawn by condors or eagles will hand down his name to posterity, and "pocket the eagles."

S. H. N.

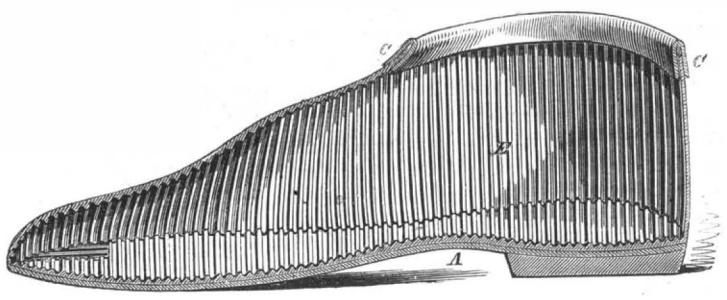
Philadelphia, Pa., April 28, 1860.

"But it is impossible to follow up this ornamental attire, through all its wonderful features of graceful curve and irridescent coloring—of downy delicacy and majestic strength—from the tiny rainbow that plays on the neck of the humming-bird, to the beds of azure, emerald and hyacinth, that tesselate the wings of the parrot tribe, or the ever-shifting eyes that dazzle in the tail of the peacock—from the splendor and taper elegance of the feathers of the bird-of-paradise, to the giant quills of the crested eagle or the condor—that crested eagle which is as large as a sheep, and is said to be able to cleave a man's skull at a stroke; and that condor which, extending its enormous wings to a range of sixteen feet in length, has been known to fly off with children ten or twelve years of age. Why have not these monsters of the sky been appropriated to the use of man? How comes it that he who has subdued the ocean, cultivated the earth, and harnessed elephants and even lions to his chariot wheels, should have never availed himself of the wings of the eagle, the vulture or the frigate pelican? How comes it that, having conquered the difficulty of ascending into the atmosphere, and ascertained the possibility of traveling at the rate of eighty miles an hour through its void regions, he should yet allow himself to be the mere sport of the whirlwind, and not tame to his use, and harness to his car, the winged strength of these aerial racers, and thus stamp with reality some of the boldest fictions of the heathen poets? The hint has, indeed, long been thrown out; and the perfection to which the art of falconry was carried in former times sufficiently secures it against the charge of absurdity or extravagance."

McEWEN AND PATTERSON'S VENTILATING SHOES.

The object of the invention which we here illustrate is the complete ventilation of a boot, shoe or overshoe, so that the vapors which are constantly passing off from the feet may be carried away and the feet thus kept in a dry, comfortable and healthy state.

This important object is accomplished simply by making the inner surface of the shoe corrugated or grooved;



the grooves being longitudinal, transverse and diagonal, so as all to communicate with each other and with the mouth of the shoe. To prevent dust or water from entering these grooves, a shield is constructed around the mouth of the shoe, this shield being fastened to the inner surface and folded over the edge so as to hang down a short distance. It should not lap down closely upon the edge of the shoe, but should be of sufficiently rigid material to maintain itself a little above the edge, thus forming a channel for the escape of the air.

In walking, the air will be pressed from the grooves in the bottom of the shoe whenever the weight of the wearer comes upon it, and the grooves will be again filled with air when the foot is raised, and thus a constant circulation is produced. India-rubber overshoes constructed in this manner will be more elastic than if made in the ordinary method, and, in consequence of yielding more readily to gravel and other wearing substances, will be more durable.

The patent for this invention was secured, through the Scientific American Patent Agency, April 17, 1860, and the claim will be found on page 285. Any persons desiring further information in relation to it will please address the inventors, W. S. McEwen and N. A. Patterson, at Kingston, Tenn.

THE COTTON GIN—LETTER FROM A PLANTER.

MESSRS. EDITORS:—I have read with interest the communications of "A. J. H." and Mr. Chichester, in your valuable and liberal paper relative to the ginning of cotton. A. J. H. has started a nail in the right direction, and Mr. Chichester has clinched it in a manner to command the respect of every inventor. Just let any community make the appropriation of $5,000, mentioned by Mr. Chichester, and I am bold to say that if his gin does not answer the purpose, I know of one that *will*. It is the gin for which you took out Letters Patent for me last season, and it has shown itself by actual experiment most decidedly superior to the gins at present in use. It will take numerous manufacturers of gins to supply the vast demand when the field is fairly open, but the "bars" are now down, and competition is the mainspring to the inventor's hopes. So pile up the dollars, ye planters of Upland cotton! and we will trot out the gins.

HIRAM W. BROWN.

Millville, N. J., April 26, 1860.

Since the foregoing was put in type, we have received another letter from the gentleman first mentioned by the above correspondent, which we here append:—

MESSRS. EDITORS:—On page 212 of the present volume of the SCIENTIFIC AMERICAN, you published an article of mine in relation to an improvement upon the present method of ginning cotton. In that article I spoke of what the fault was in the present method of ginning by the gin now universally used, called "Whitney's." It was in substance this. The staple of the cotton is cut and warped by the teeth of the saw, and the improvement should consist in taking the lint from the seed without damaging the staple; another great improvement would be to clean the cotton from sand, dust and trash of all kinds.

I am now receiving letters from all portions of the Union on this subject, and am truly glad to know that the subject of this improvement has awakened an interest among the inventive genius of our country. A great portion of these letters are from northern men, who are wholly unacquainted with the present method of ginning, but are sanguine that they can readily overcome this difficulty. But permit me to say I regard this improvement as no "child's play," and I advise all those who wish to make this improvement to first go on a plantation and *witness the working* of the gin now in use. They can then tell exactly how to commence; and without they do this, or at least get a draft of the Whitney gin, their labor (I am afraid) will be lost. Several persons have written to me to forward them cotton in the seed by express. I would cheerfully do this, but, unfortunately, we are not blessed with an express in Arkansas! In letters to these parties I have enclosed cotton in the seed, which is the best I can do; but the quantity is so very small that I am fearful it will not aid them much. I will now reiterate my advice:—Go on a plantation and examine minutely the present method of ginning, then go home and apply yourself to this task; and if you *do* succeed, you will, in a very short period, possess divers plantations, and gin your own cotton as it ought to be done.

A. J. HILL.

Camden, Ark., April 21, 1860.

THE PROFITS OF TANNING.

MESSRS. EDITORS:—I notice on page 218 of the present volume of the SCIENTIFIC AMERICAN an article on the above subject, in which you state that the cost of 10,000 hides (adding commission and interest) would be $54,208, and the proceeds of the leather (deducting commissions) would be $69,484 80; thus leaving the *apparent* profit of $15,276 80. Whereas, the actual cost for the tanning (alone) of 10,000 hides, at the lowest estimate, would be £20,000, which obviously leaves the tanner *minus* the sum of $4,723 20. Hence, hides must fall in price to enable tanners to make a profit, or they must discontinue their operations until the demand for leather exceeds the supply.

T. S.

Philadelphia, April 26, 1860.

[Our correspondent will please remember that the statement which he criticizes was not made by us, but by a number of leather-dealers of this city, in a circular to which we gave credit at the time we printed the statement.—EDS.

OUR FRIENDS.

The circulation of the SCIENTIFIC AMERICAN has steadily increased since the beginning of the new series, and is now greater by several thousands of copies per week than ever before. We are mainly indebted to such friends as the following for this result. Messrs. Hamilton and Sons, and all other friends, have our warmest thanks for their continued interest in our behalf:—

MESSRS. MUNN & CO.:—We herewith remit you $33 20, the club rate (including the American postage) for 20 copies of the SCIENTIFIC AMERICAN. The above copies have been subscribed for by our men.

WM. HAMILTON & SONS

Toronto, C. W., April 21, 1860.

NEW MAP OF THE CITY AND ENVIRONS.—A. Lindenkohl and P. Witzel, (the latter of Craneville, N. J.,) have just completed a map of this city and vicinity, compiled from the United States Coast Survey and from such further surveys of their own as were necessary, the execution of which is very creditable to the engravers and printers. It is done in line, and notwithstanding the smallness of the scale, all the names and outlines are remarkably clear and distinct. The map embraces the whole of Manhattan island, and a portion of Westchester county, including Fordham, Westchester and Throg's Neck, all the western end of Long Island as far as Little Neck Bay, Brushville, beyond Jamaica, Far Rockaway and the Pavilion, and on the West takes in a considerable section of New Jersey, embracing Sandy Hook, Highland Light, Keyport, South Amboy, Perth Amboy, Rahway, Elizabeth, Elizabeth Port, Newark, and Hackensack, and of course taking in the whole of Staten Island. It is published by Westerman & Co., No. 440 Broadway, this city.

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DURKEE'S GRAIN-BINDER.

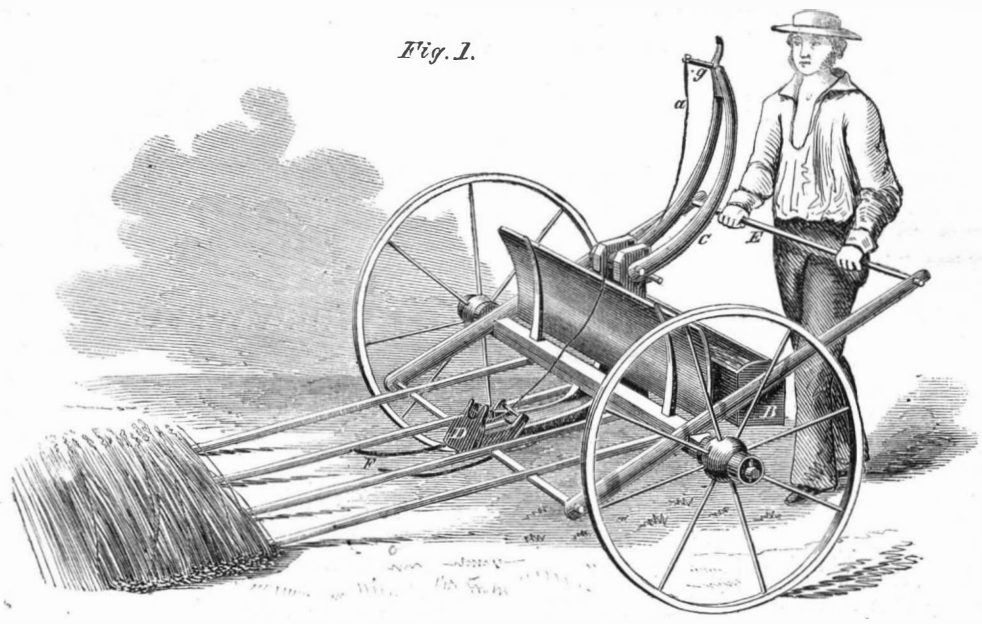
The immense value of reaping machine inventions to the world, as well as to the patentees, has stimulated people to devise improvements in other of the harvesting operations, and we have taken out a number of patents for grain-binders. Judging, however, from their continued perseverance in this department, it would seem that our inventors do not believe that the perfect grain-binder has yet been produced. The invention here illustrated is represented in two forms, one to be operated by hand, and the other to be attached to a reaping machine.

Fig. 1 represents the hand machine in operation. The bundles of grain are bound with stout twine bands, a number of which, ready prepared, with an iron button at one end and a loop at the other, are carried in the box, B. One of these bands, *a*, is attached to the machine in the manner shown, with the button at the upper end of the arm, C, and the loop at the lower end, held open ready to receive the button by the jaws, D. The operator pushes the machine along with the fingers under the swath of grain, as shown, until a sufficient quantity is collected for a bundle, when he tilts the fingers up, and places his foot upon the rod, E. He now, with his left hand, draws the pivoted fork, F, over towards him, so as to compress the bundle in its middle, and then bends forward with his right hand the arm, C, which is so arranged as to pass the button upon one end of the band through the loop upon the other end. As the end, *g*, of the arm, C, passes through the loop it strikes a plate which is secured to one of the jaws, in such a manner as to open the jaws and release their hold upon the band. When the operator relaxes his pressure upon the forks, F, and the arm, C, the elasticity of the straw causes the bundle to expand, and thus the button is drawn tightly under the loop, and the band secured in its place. The operator then removes the bundle with his left hand; and, having taken a band from the box while gathering the grain for the first bundle, he quickly attaches it to the machine, and repeats the operation.

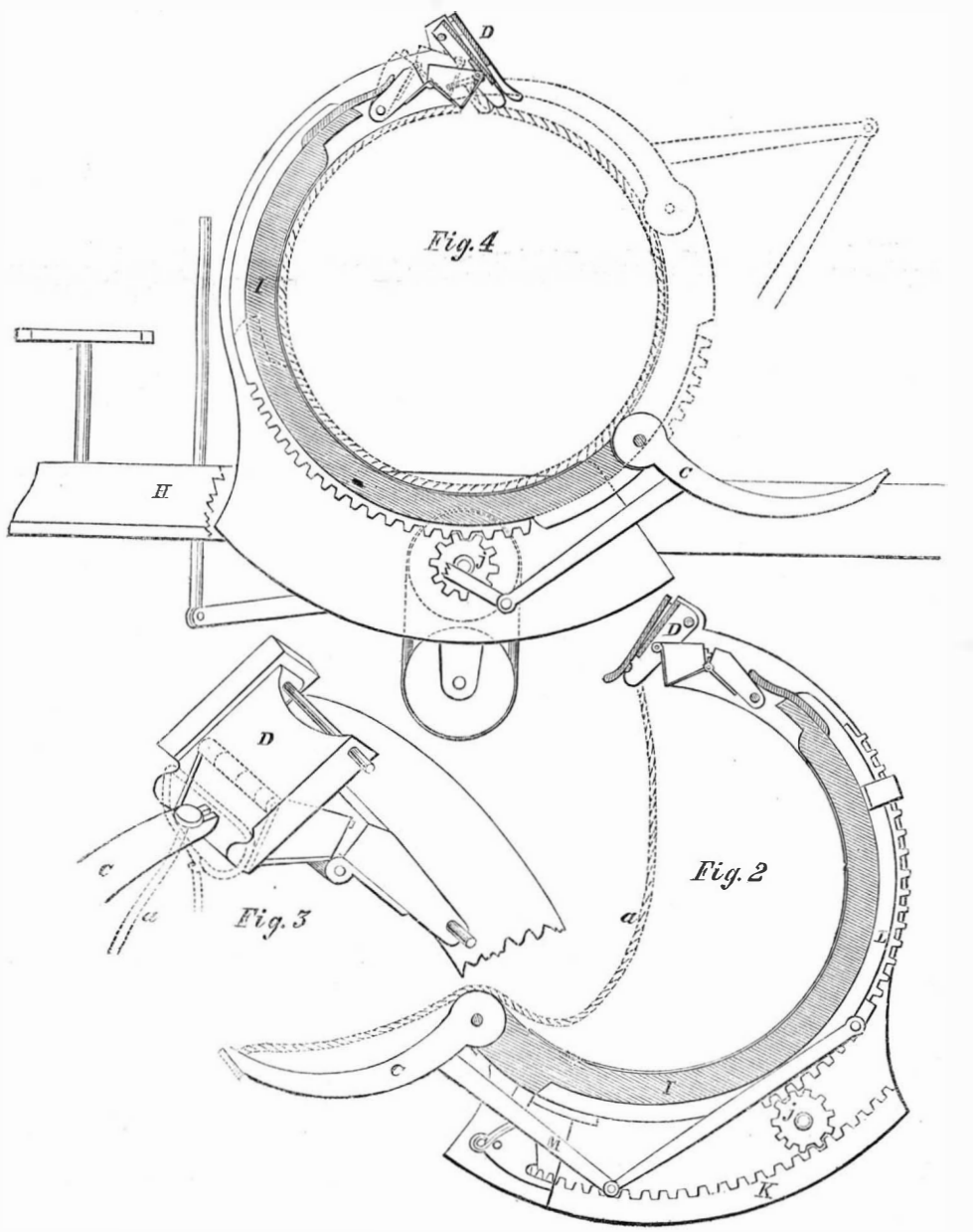
Figs. 2, 3 and 4 illustrate this invention in its application to a reaping machine. The arm, C, is attached by a pivot to the end of a sliding segment, I, of a metallic circle which is secured firmly to the platform, H, of the reaper. While the grain is being gathered upon the platform, the arm, C, and segment, I, are in the position shown in Fig. 2, and in the full black lines in Fig. 4, but when a sufficient quantity has been collected to form a bundle, a rack upon the segment is thrown into gear with the driving wheels which turns it quickly forward and upward into the position shown in the dotted lines in Fig. 4. This motion brings the pinion, *j*, into gear with the concave rack, H, so that as this pinion is rolled along, it turns the sliding segment, L, more rapidly than the segment, I, moves, by which means the arm, C, is bent forward upon its pivot through the action of the jointed lever, M, so as to pass the button upon the end of the band, *a*, through the loop upon its opposite end. The motion of the parts is then reversed by the workman, who removes the bundle from the platform, and while the reaper is passing along and collecting grain for the next bundle, he places another band in position to receive it; thus performing the binding as fast as the grain is cut.

The patent for this invention was procured through the Scientific American Patent Agency, on Nov. 22, 1859; and further information in relation to it may be obtained by addressing the inventor, C. H. Durkee, at Hartford, Wis.

Fig. 1.



DURKEE'S IMPROVED GRAIN-BINDER.



CHANGING MOTION.

MESSRS. MUNN & Co.:—Your description of "Hathaway's Mode of Converting Reciprocating Rectilinear into Rotary Motion," published on page 256 of the present volume of the SCIENTIFIC AMERICAN, does injustice to the invention, at least in one particular, which I beg you to amend. You say "the light springs, *e e*, are attached to the arms, and to the supplementary short arms, *p p*; the latter being prevented from turning over by the spokes, *r r*, which are inserted into the pulley." Here are several inaccuracies, to correct which, allow me to state that the "supplementary short arms" are *not* supplementary; neither are they *short;* all the arms are of the same length and pattern, but so adjusted in their sockets as to present alternate divergencies from the radial direction. "The spokes, *r r*," are *not* inserted into the pulley, but into a collar, movable on the pulleys by a springcatch, and which, by its position, for the time, determines the direction of revolution. Thus the collar, by its spokes pressing one or the other pair of arms (pawls) out of action, by receding from, permits the other pair to come into action.

The model under illustration, therefore, is reversible at the will of the operator, without reversal of the rectilinear motion. It was intended to exhibit the utmost capacity and range of the device; had rotary motion in one direction only been intended, the collar, the spokes and that which you inaptly term the "supplementary short arms," would have been dispensed with.

The attainment of high velocity, without gearing for it, is an important advantage claimed for the device, which you have overlooked.

You remark that "a very simple demonstration will satisfy any one that there is no loss of power whatever by the crank motion." I, for one, would be greatly obliged if you would furnish this demonstration through your columns or otherwise.

Please correct my address, which, after May 1st, will be Milwaukie, Wis. JOSHUA HATHAWAY.

Marietta, Ga., April 26, 1860.

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THE INSTINCT OF APPETITE.

Chemical analysis and physiological research have established, beyond dispute, that every article of food and drink is composed of elements differing in quantity or quality. It is equally true that the various parts of the human frame are different in their composition, as the bone, the flesh, the nerve, the tendon, &c. But there is no element in the human body which is not found in some article of food or drink. A certain normal proportion of these elements, properly distributed, constitutes vigorous health, and forms a perfect body. If one of these elements be in excess, certain forms of disease manifest themselves; if there is not enough, some other malady affects the frame. When the blood contains less than its healthful amount of iron, it is poor, watery and comparatively colorless; the muscles are flabby, the face pale, the eyes sunken, the whole body weak, the mind listless and sad. If the bones have not enough lime, they have no strength, are easily bent, and the patient is rickety; if there is too much lime, then the bones are brittle, and are broken by the slightest fall or unusual strain. The highest skill of the physician in these cases consists in determining the excess or deficit of any element, and in supplying such food or drug as will meet the case; when the medical attendant cannot determine what is wanting nor furnish the supply, nature is often loud enough in her calls, through the tastes or appetites, to indicate very clearly what item of food or drink contains the needed elements; this is the "Instinct of Appetite." Chemistry is unable to say of but one article of human food, that it contains all the constituents necessary to supply the human body with every element requisite for its welfare, and that is pure milk, as supplied by the mother of the new being; but after the first years of life, the body demands new elements, in order to enable it to meet the duties which increasing age imposes; hence, nature dries up this spring, as being no longer adequate, and compels the search for other kinds of sustenance, showing that milk is a proper sole food for the young ones; and healthy grown persons who live upon it mainly will always become invalids.

All kinds of life, whether vegetable or animal, have within them a principle of preservation, as well as of perpetuity; were that not the case, all that breathes or grows would die; this principle or quality is common to man and beast, and all that springs from root or seed; it is named "Instinct." It is instinct which calls, by thirst, for water, when there is not fluid enough in the system. It is instinct which calls for food, by hunger, when a man is weak and needs renovation. It is curious and practically valuable as a means for the removal of disease, to notice the working of this instinct, for it seems to be almost possessed with a discriminating intelligence; certain it is, that standard medical publications give well-authenticated facts, showing, that following the cravings of the appetite, the animal instinct, has accomplished for more than the physician's skill was able to do; has saved life in multitudes of cases, when science had done its best, but in vain.

About three years ago, the little daughter of a farmer on the Hudson river, had a fall, which induced a long, painful and dangerous illness, ending in blindness; medication availed nothing. By accident, a switch containing maple buds was placed in her hands, when she began to eat them, and called earnestly for more, and continued to eat them with avidity, improving, meanwhile in her general health for some fifteen days or more, when this particular relish left her, and she called for candy, and, as in the case of the buds, ate nothing else for two weeks, when this also was dropped, a more natural taste returning with returning eyesight and usual health. This was instinct calling for those articles of food which contained the elements the want of which laid between disease and recovery.

A gentleman aged thirty-six, seemed to be in the last stages of consumptive disease, when he was seized with an uncontrollable desire for common table salt; he spread it in thick layers over his meat, and over his bread and butter; he carried it in his vest pocket, which was daily emptied by eating a pinch at a time. He regained his health, and remained well for years afterwards.

More recently, a case occurred in England of a child gradually declining in health, in spite of all that could be done by a remarkably shrewd and observant physician. On one of his visits, he found the father sipping a glass of toddy. The thought occurred to the doctor to offer some of it to the child, who took it with great satisfaction. The hint was improved; more was given, and more; and for two months this child of two years old lived almost wholly on whisky-toddy, when the desire declined, a more natural appetite returned, the health improving every hour, and was eventually entirely restored; but ever thereafter the child loathed the very smell or even sight of whisky-toddy.

A similar case is reported where a sick child took a pint of ale daily, and nothing else for many days, ultimately recovering, when the sight of an ale bottle could not be endured. The child of a New Yorker was supposed to be dying of the "summer complaint." As a last and desperate resort, it was hurried off to Rockaway in August, having the (usually considered fatal) hiccup when it started. Immediately on its arrival, on a cold, raw, chilly evening, about an hour after sundown, some fresh milk from the cow was instantly boiled and offered to it. It was with difficulty that the bowl could be withdrawn from its poor emaciated fingers. After an hour's interval more milk was given, and nothing else, for a number of days. That child is now one of the heartiest, healthiest girls in New York!

In the cases above given, the children could not name their cravings; but accident threw in their way what the instincts required. Grown persons can express their cravings. There are many persons who can record, from their own personal experience, the beginning of a return to health, from gratifying some insatiate desire. The celebrated Professor Charles Caldwell was fond of relating in his lectures, that a young lady, abandoned to die, called for some pound-cake, which "science" would have pronounced a deadly dose; but as her case was considered hopeless, she was gratified and recovered, living in good health afterwards. But in some forms of dyspepsia, to follow the cravings is to aggravate the disease, life is made intolerable, and suicide closes the scene. In low fevers, typhoid, yielding to the cravings is certain death.

To know when and how to follow the instinct of appetite, to gratify the cravings of nature, is of inestimable value. There is a rule which is always safe, and will save life in multitudes of cases, where the most skillfully "exhibited" drugs have been entirely unavailing. Partake at first of what nature seems to crave, in very small quantities; if no uncomfortable feeling follows, gradually increase the amount, until no more is called for. These suggestions and facts find confirmation in the large experience of that now beautiful and revered name, Florence Nightingale, whose memory will go down with blessing and honor side by side with that of the immortal John Howard to remotest time. She says:—"I have seen, not by ones or tens, but by hundreds, cases where the stomach not only craves, but digests things which have never been laid down in any dietary for the sick, especially for the sick whose diseases where produced by bad food. Fruit, pickles, jams, gingerbread, fat of ham, of bacon, suet, cheese, butter-milk, &c., were administered freely, with happy results, simply because the sick *craved* them."

SLEEPING UNDER THE CLOTHES.—There is reason to believe (says Miss Florence Nightingale) that not a few of the apparently unaccountable cases of scrofula among children proceed from the habit of sleeping with the head under the bed-clothes, and so inhaling air already breathed, which is further contaminated by exhalations from the skin. Patients are sometimes given to a similar habit; and it often happens that the bed-clothes are so disposed that the patient must necessarily breathe air more or less contaminated by exhalations from the skin. A good nurse will be careful to attend to this. It is an important part, so to speak, of ventilation. It may be worth while to remark, that when there is any danger of bed-sores, a blanket should never be placed under the patient. It retains damp, and acts like a poultice. Never use anything but light Witney blankets as bed-covering for the sick. The heavy, impervious cotton counterpane is bad, for the very reason that it keeps in the emanations from the sick person while the blanket allows them to pass through. Weak patients are invariably distressed by a great weight of bed-clothes, which often prevents their getting any sound sleep whatever.

A cotton mill to contain 10,000 spindles is now building at Narod, in Russia.

LITERARY AND SCIENTIFIC NOTICES.

MORIN'S MECHANICS.

This valuable book has been revised, translated and edited by Joseph Bennett, C.E., and is published by D. Appleton & Co., of this city. The original French work has a high reputation. The name of M. Morin has long been familiar to our mechanics for his experiments with dynamometers to test the power of motors, and also for his experiments to ascertain the amount of friction generated by moving bodies on rolling and sliding surfaces. This work differs from most others on mechanics. It is not a mere elementary disquisition, but a practical treatise, containing much that is useful about machinery. As much has been said and written during the past year regarding the possibility of aerial navigation; and as propositions have been made both by Mr. J. Wise and La Mountain to cross the Atlantic in a balloon, we find that M. Morin entertains the opinions we have always advanced with respect to the *impossibility* of successful aerial navigation in the present state of science and art. In a chapter on the resistance of fluids he refers to balloons, and quotes General Muesnier's memoir on the subject. He says:—

"We have examined the possible effects of many machines invented to direct balloons. These machines may be moved by men whose weight is great compared to their force. It follows that they will have but little effect in overcoming the resistance of the air on account of the great surface of the balloons. Calculation applied to the means of direction, of whatever character they may be, shows in general that they can never afford for balloons a velocity over 3.64 feet per second, independently of the wind."

In another place he says:—

"As for motors, such as steam engines, their own weight, that of the fuel and of the water, would tend to give such dimensions to the balloon that the work of the resistance of the air, in small volocities, would prevail over that which could be developed by the motive apparatus. Finally, in the present state of our knowledge and progress in the mechanical arts, the solution of the question of aerial navigation is shut within a circle we cannot pass without discovering some new motor at once light and powerful in relation to the quantity of work to be developed."

These opinions are exactly similar to those expressed on this subject on page 21, Vol. XIV. (old series) of the SCIENTIFIC AMERICAN.

CALICO-PRINTING AND DYEING.

On these subjects J. Wiley, of this city, has recently published quite a large and handsome volume, the main part of which is by "an experienced dyer," with a briet supplement by R. Macfarlane. This latter contains almost all that is known regarding those new dyeing materials—aniline and murexide. It also gives the substance of quite a number of American and foreign patents obtained during the past five years; the object being to bring up the art to the present day. The information is conveyed in clear and plain language, so as to render it as thoroughly practical as possible under the circumstances. We quote the following from its columns as interesting to all:—

"A patent was issued to D. F. Grant (England) in July, 1856, for incorporating with inks and colors used for printing, such oderiferous gums or essential oils as will impart to printed flowers the same odors as the natural flowers which they represent. In the manufacture of artificial flowers such scented oils may be applied to them with a pleasing effect."

The following good advice is given for extracting the colors of dyewood:—

"When sugar or oils are subjected to a high temperature they acquire a rusty brown color, but exposure to a low temperature, when these substances are undergoing purification, prevents this evil. In treating dyewoods to obtain extracts of coloring matter, especially for red, crimson, purple, violet, and such colors, it would be a decided improvement to use a vacuum pan and a low temperature, because Brazil wood and logwood yield a brownish coloring matter at a higher temperature than that at which a clear red or violet coloring matter is obtained."

DEATH OF AN INVENTOR.

Herr Bauer, the originator (in Europe) of all the various quick methods of printing, recently died in Wurzburg, at the age of 70 years. He was born at Wurtemburg, and was an engineer by profession. He commenced his labors in 1810. The first press made by him was for the London *Times*; the second for a Berlin paper; the third for the State printing-house of Prussia; while the fourth was sent to this country. He retired from business some time ago, and lived long enough to see great improvements (by other inventors) on his original creations.

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POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported expressly for the Scientific American.]

On Thursday evening, the 19th ult., the usual weekly meeting of the Polytechnic Association was held at its room in the Cooper Institute, this city; the president, C. Mason, in the chair.

MISCELLANEOUS BUSINESS.

The Patent Laws.—The committee appointed to consider the modifications of the patent laws lately proposed in Congress made their final report. The committee, in the main, approve the new measures, and recommend that the American Institute send a memorial on the subject to Congress. After a somewhat protracted discussion, the report was referred to the Committee on Arts and Science.

A description of a hot-water furnace was then given; and at the conclusion of the miscellaneous business, a spirited debate took place, in which, owing to some misapprehension of the words of a member, a little unscientific excitement was manifested, and some harsh words were used. But on the president suggesting that members were *not yet on the floor of Congress*, the club soon resumed its accustomed good temper.

The president then announced the regular subject—"Iron Buildings."

DISCUSSION.

Mr. Ayres (representing the establishment of James Bogardus)—It is now 10 or 12 years since Mr. Bogardus brought the subject prominently before the public. Before that time iron buildings had been attempted in Europe as well as in America; but the attempts were failures. Iron had been used in parts of buildings for columns and even for the entire framework; but Mr. Bogardus was the first to construct a building of iron, so that iron should form a chief part of its architecture. From the facility with which iron receives any form, he foresaw its ready application to any style of building. His views have been carried out on a large scale, and his buildings are erected in all parts of the country; and their effect on the art of building generally, and in the improvement of the general taste, cannot be doubted. Iron is the most substantial of all building materials; it requires a pressure of 210,000 lbs. to the square inch to crush it, and of 85,000 lbs. to the square inch to pull it asunder. For economy, stability and beauty, nothing surpasses iron. The main feature of Mr. Bogardus' invention, and for which he has a patent, is his method for making joints by planing and bolts. The sill-courses are cast in sections, the ends planed true, and secured by bolts. An iron building built by Bogardus is like a box, and may be turned over or lifted up without disarranging the parts. The foundation may be taken away, but as long as the center of gravity is supported the building is firm. In the Duane-street building, erected about 10 years ago, all the parts were found perfect as when first put together; and no rust at the joints, for there was no space to admit water.

The President—We found in Boston that the opening of joints by expansion and the rusting formed a serious objection to the use of iron for building.

Mr. Ayres—We have had no such experience. We have had no practical difficulty with the expansion; in the Duane-street building we could find no joint open enough to admit a knife blade.

Mr. Reed—It was once supposed that it was necessary to leave intervals at the joint of rails on railways. But the latest practice has been to lay the rails as close as possible; and if any interval is visible, it is closed up by a wedge.

Major Serrell—Yet the fact of expansion of iron by heat should not be doubted. I have satisfied myself of the amount of expansion in soft and cast iron and building stone by over 2,000 experiments. The Niagara Bridge and the St. John's Bridge, and others, gave good opportunities of noticing the practical effects of expansion. Soft iron expands 1 part in 1.213 by raising its temperature 212°; cast iron, under the same circumstances, expands 1 part in 1.900 to 2.300.

The President—A large marble store in Broadway is an evidence of the weakness of this material; nearly all of the narrow supports between the windows are giving way; the building cannot stand 40 years. Iron, however, is used in the new parts of the building. Iron is not artistic, and the facility of getting it into any form gives too good an opportunity to the vulgar to parade their bad taste. I can point to many iron buildings which offend every principle of art.

The same subject is to be continued at the next meeting.

Correction.—In the report published on page 263 of this journal, it is stated that Mr. Fisher's carriage run 3½ miles at the rate of 32 to 35 miles per hour. The complete statement, as given at the meeting, was that Ogle & Summer's carriage ran at this rate, and had 1 foot of boiler to 40 lbs. of the total weight; and that Mr. Fisher's carriage, which has 1 foot of boiler to 75 lbs. total weight, ran a mile at the rate of 22½ miles per hour.—*Rep.*

NOTE.—We trust that the members of the Polytechnic Institute will preserve the utmost decorum throughout their proceedings, and not suffer any interruption of the *entente cordiale*, such as was manifested on Thursday evening. The dignity of the Institute will be lowered in public estimation by such belligerent exhibitions, and we hope the President will endeavor to keep order, even if he has to call in the police to aid him.—EDS.

A PIPE MADE IN A CHICKEN'S GIZZARD

MESSRS. EDITORS:—I have what I consider quite a curiosity, namely, a piece of slate pencil one inch in length, which has been perforated throughout, endwise, by the action of the gravel, &c., in the gizzard of a hen; for we took it (in its present condition) from a hen that we recently killed for the table. About two or three months before we found it, we had furnished our children with slates and pencils, and the latter were frequently broken; while at the same time (it being in the Spring of the year), our youngest child often called the fowls around the door and threw corn to them, which was the time, undoubtedly, when the pencil was swallowed. The hole is a little less than an eighth of an inch at the ends, but is a little larger the rest of the way through, and is not round but oblong, exactly the shape of the pencil outside. The outside of the piece was not affected except a slight rounding of the broken ends. The query is—How could this be perforated without grinding off the outside? Believing this may be interesting to some of your readers, I send it to you for publication.

R. C. N.

Guilford, N. Y., April 28, 1860.

[We are accustomed to believe many curious things, but find some difficulty in "taking down" this gizzard story. We prefer to believe, in the absence of proof, that the hole was *drilled* in the pencil before it was swallowed by the chicken.—EDS.

HARDENING EDGE TOOLS.

MESSRS. EDITORS:—I noticed on page 180 of the present volume of the SCIENTIFIC AMERICAN, an article on dressing mill-picks, by "F. F. S.," of Momence, Ill., and with nearly all his remarks I could agree. I presume I could not say anything on the subject, that would be new, although what I shall say is what I have found out by my own experience. I have noticed, when I have taken pains, when drawing out picks, to hammer as much in one place as another, and as much on one side as the other, and to let the hammering be on the flat sides across close to the edge, and up each side about an inch, that, in hardening, the corners never crack off. The same process I think will work well with all edge tools. I would like to have those that have not tried this plan to do so, and report progress.

D. W.

Marengo, Ill., April 26, 1860.

SINGULAR CAUSE OF GAS EXPLOSIONS.—It has been ascertained by an eminent German chemist that carbureted hydrogen, or illuminating gas, when brought into contact with certain saline solutions, especially nitrate of silver, will form substances of a highly explosive nature. Dr. Torrey, of this city, has found that illuminating gas, passing through copper pipes, produces an explosive deposit on the inner surface, which, if struck, however slightly, will detonate. These discoveries may account for explosions hitherto unexplained. Pursuing the subject, Mr. Septimus Piesse, after a series of experiments performed in his laboratory, finds that these deposits are, in truth, fulminates of the metals in question—similar to the material employed to fill percussion caps. Mr. Piesse observes that coal gas is frequently contaminated with cyanic and fulminic compounds of ammonia, which fully accounts for the detonating compounds being produced.

A COLUMN OF VARIETIES.

At the close of 1859 there were 1,109 miles of railroads in Spain.....The public will learn with satisfaction that, under the new management of the undertaking, there is at length a good prospect of the *Great Eastern* being really completed and sent to sea. The whole of the £100,000 of additional "preference" capital, recently authorized to be raised, has been taken up by the present proprietors.....It is written in a quaint old Jewish manuscript, now in the British Museum, that the oldest of mankind, Methuselah, did not live as long as he might have done. The writer says that God promised him, in a dream, that if he would rise up and build him a house, his life would be prolonged five hundred years. But he replied that it was scarcely worth while to build a house for so short a period, and he died before he was a thousand years old.....At a recent demonstration against the government of the Pope, by the discontented people of Rome, Mr. Hall, a young clergyman (son of Dr. Hall, of Providence, R. I.), while looking at the crowd, was wounded by a sabre cut in the forehead, by one of a band of mounted soldiers who were driving the people from the streets.....In the excavations going on, in the construction of a railroad from Paris to Lyons, in France, the remains of 25 human beings were discovered, and the owner of the land has been arrested on suspicion of the murders. How does it happen that 25 persons could disappear in the heart of France without any notice being taken of it? It looks a little as if the high reputation of the French police was mainly owing to the comparative dearth of newspapers, which, in free countries, are stimulated by intense rivalry to make the most out of every tragedy which occurs.....Chief Justice Taney, of the Supreme Court of the United States, is in the 85th year of his age, and all his eight associate justices, except one, are over 70 years.....We have been challenged by a dealer in patent rights to name a single invention which has been patented 5 years, and which possesses any merit whatever, that has not been introduced and made profitable.....In pruning trees, and especially in cutting-off nursery trees after budding, it is an excellent plan to coat the wound with a solution of gum shellac in alcohol..... Since the opening of the New York State Lunatic Asylum, in 1843, 5,828 patients have been admitted, and 5,195 have been discharged; of which number 2,340 had recovered, 859 had improved, 1,280 were discharged "unimproved," 671 had died, and 42 were not insane .....There are over 3,000,000 of artificial porcelain teeth made annually in this country, mostly in Philadelphia .....*Le Génie Industriel*, of Paris, contains an illustrated description of an American steam fire-engine, the drawings of which were carried from this country by Mr. Godard, the aeronaut.....The duchies of Modena, Parma and Tuscany, in Italy, which have just voted, by universal suffrage, to join Piedmont, and thus come under the liberal and popular government of that kingdom, were flourishing republics, contending manfully and successfully for their independence against the power of Austria, more than 400 years ago.....The School Committee have forbidden the assignment of lessons for study out of school, in the Boston schools for girls. This prohibition should be extended to the schools for boys, and adopted universally.....A steam fire-engine has been constructed in this country for the Emperor of Russia .....18 cubic feet of ordinary brickwork weigh 1 ton..... The weight of the rim of a fly-wheel should be about 3 cwt. per horse-power.....The crushing strain of wrought iron is about 16 tuns per square inch, or less than one-third that of cast iron.....Pure olive oil becomes solid in contact with nitrous acid, but if it be adulterated with any other oil this result does not ensue.....According to Colonel Beaufoy's experiments, the deduced friction through the water of each square foot of a vessel's bottom would be 1.2 lb. at 13 knots an hour.....Solid columns, of a hight exceeding 25 diameters, will fail, in almost every case, by bending. Hollow columns do not fail by bending until the hight is as much as 50 diameters.....The Cornish pumping engine, erected in 1838, by Messrs. Harvey & Co., at Old Ford (England), raised on one occasion, and for six hours together, 118,522,475 lbs. 1 foot for every 94 lbs. of coal burned. This was equal to the expenditure of but 1.57 lb. per horse-power, per hour.....The average passenger fare upon the principal railroads of the State of New York is 2 cents a mile. At this rate more than nine-tenths of the passengers are first-class.

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IMPROVED PLANING MACHINE.

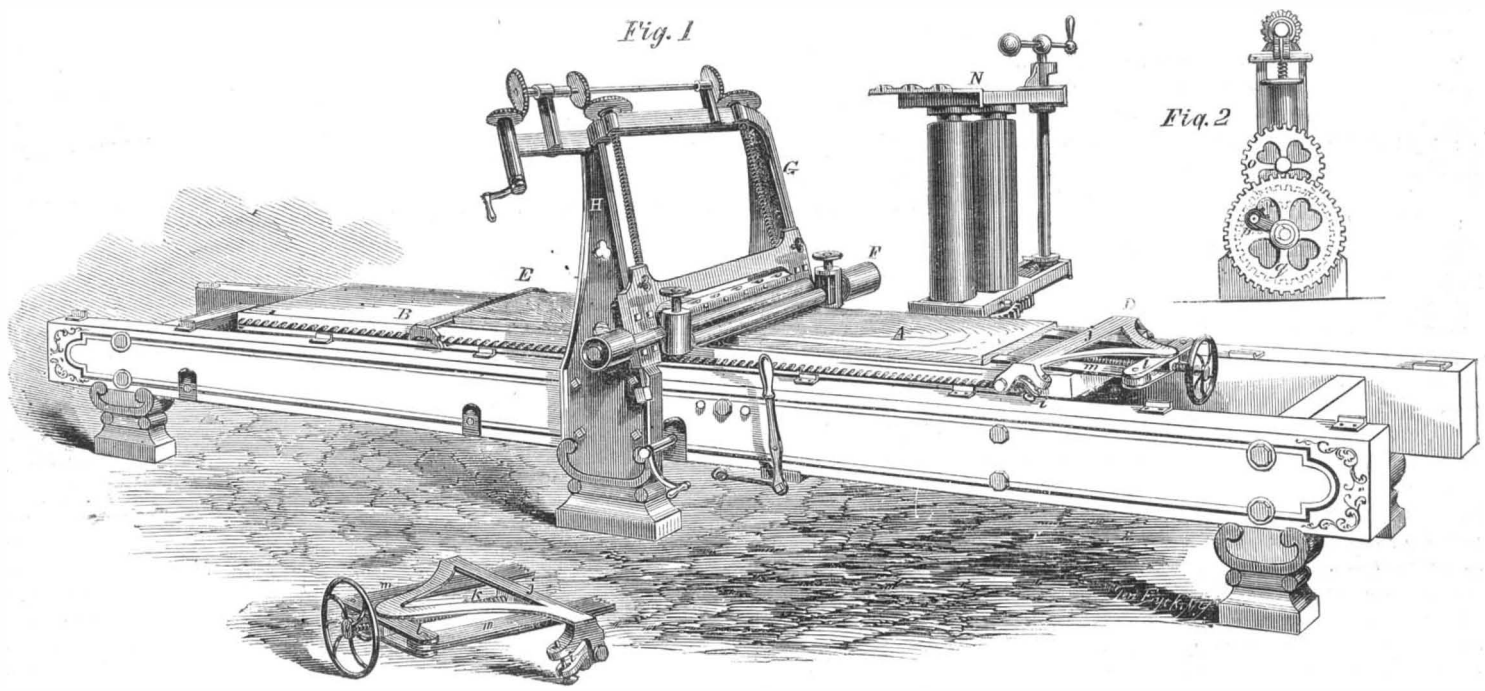
The object of the several inventions in the construction of this machine is to produce a perfect planer, adapted to the various modes of planing boards or other forms of wood in machine-shops, carriage manufactories, carpenters' shops, &c. It is arranged for planing boards in the ordinary manner of a Woodworth planer; or it may, by a slight change of parts readily effected, be fitted to cut winding "stuff" to a plane surface, in the manner of the Daniels planer. It is shown in the engraving as arranged for the latter purpose.

The "stuff," A, firmly secured by the dogs, D and E, upon the platen, B, is carried along under the cutters, which are secured upon the radiply-revolving shaft, F. One of the principal peculiarities of the machine is the form of the cutters and shaft, which are so arranged as to operate in a manner similar to the double iron of an ordinary bench plane. Eaton, Gilbert & Co., the famous car manufacturers of Troy, say that this form of cutter produces the most perfect work, and that they find all their workmen taking their finest work to this machine for finishing the surface. The cutter shaft is secured in a frame which slides up and down the inclined ways, G and H, to adjust its hight to the thickness of the stuff; the worms and gears by which this adjustment is effected are plainly shown in the cut. The dog, D, secures one end of the stuff always at about the same distance from the end of the platen, while the dog, E, is movable on the platen to adapt its position to the length of the stuff. The construction of the dog, D, embraces one of the peculiar features of this invention. Two iron studs are inserted, one into each edge of the platen, for the lips or inclined planes, *i*, to catch under. To the lower side of the cross-bar, *j*, to which the lips, *i*, are pivoted, is secured a block, with a smooth hole in it for the passage of the smooth or threadless part of the worm, *k*; while the thread of this worm meshes into a female screw in the cross-bar, *l*, to the ends of which the two claws, *m m*, of the dog are pivoted. Thus, when the lips, *i*, are caught under the studs in the platen, by turning the worm, *k*, the claws are forced into the end of the stuff; and, at the same time, by the sliding of the inclined planes, *i*, under the studs, the cross-bar, *l*, is drawn down upon the claws, *m m*, and thus the stuff is secured very firmly to the platen. The lips, *i*, are hung upon pivots, and made adjustable to a greater or less angle by set screws, so as to be adapted to holding different kinds of wood with various degrees of firmness. The end pieces of the movable dog, E, are made to grasp under the racks upon the edges of the platen at their forward ends, and drop into the teeth in the rack at their other ends; thus holding, when the stuff is pressed against them in a very rigid manner. Such is the arrangement of the machine for making winding stuff plane.

For planing boards in the manner of the Woodworth planer, the frame, N, of the feed rolls, which is secured to the machine on one side by a hinge, is turned down and fastened at the other side by bolts; the cutter shaft is adjusted at the proper hight, and the machine is ready for operation. The arrangement for varying the distance apart of the feed rollers is shown in Fig. 2. The upper roller is driven by the gear wheel, *o*, which meshes into the pinion, *p*; this pinion being driven by the gear upon the inner edge of the rim of the wheel, *q*. The pinion, *p*, has its axle upon the end of an arm which may revolve partly around the axle of the wheel, *q*, and this arm is raised or lowered with the upper feed roll, by which arrangement the wheel, *o*, is always kept in gear, whatever the distance apart of the rolls.

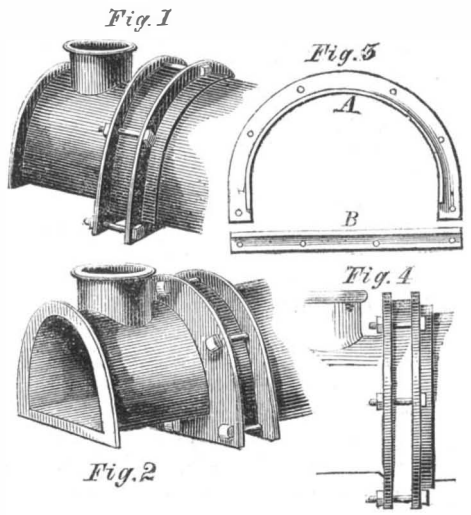
The advantages claimed for this machine by the inventors, are:—First, the combination of two machines, the Woodworth and the Daniels planers; second, the form of the cutter, by which smooth work is made in cross-grained wood; third, the arrangement for varying the hight of the cutter, by which the two ends are moved and rigidly held in positions perfectly parallel with the platen; fourth, the arrangement of the dogs, by which they are both readily adjustable to their work or removable out of the way; fifth, the convenient attachment of the feed rolls; sixth, the plan of gearing the upper roll, by which it is kept in gear at any distance from the lower roll.

The patent for this invention was granted to H. D. Stover and D. N. B. Coffin on May 19, 1857; and further information in relation to it may be obtained by addressing the Stover Machine Company, No. 13 Platt-street, New York.



STOVER & COFFIN'S IMPROVED PLANING MACHINE.

KENNEDY'S METHOD OF SECURING IRON MOUTH-PIECES TO CLAY RETORTS.



There is probably no industry in the country growing more rapidly than that of the distillation of coal. Not only are gas-works multiplying in every direction, but the comparatively new manufacture of coal oil is extending with unparalleled rapidity. The iron retorts which were first used in gas-works have been almost entirely superseded, in England, by those made of clay, and the clay retorts are now being generally introduced into this country. No sooner have they made their appearance than the brains of our inventors are busy in making improvements in their construction. The first of these improvements which we have had occasion to illustrate is represented in the annexed engravings.

Though the body of the retort may be made of clay, it is necessary to construct the mouth-piece of iron, on account of the superior facilities afforded by this material for making the connections with the pipes, and for securing and sealing the door. This mouth-piece has heretofore been fastened to the clay retort simply by forming a flange on the retort, with holes through the flange for bolts, the heads of which come in direct contact with the baked clay. As the strength of the clay is not great, this mode of fastening is not very effectual, and it is the object of the invention here illustrated to secure the iron mouth-pieces to the clay retorts in a more substantial and durable manner.

The retort is made in the usual form but without any bolt holes through the flange. An iron collar made in two pieces, A and B, Fig. 3, is then placed around the retort, behind the flange, and bolted to the mouth-piece by bolts which pass just outside of the flange, instead of passing through it. As each retort costs about $30, and as the breaking-out of the bolt holes entirely ruins the whole retort, the importance of this simple but valuable improvement will be readily appreciated.

The patent for this invention was granted March 13, 1860, and persons desiring further information in relation to it will please address the inventor, John P. Kennedy, gas engineer, at Trenton, N. J.

SCIENTIFIC CONVENTION.—Preparations are being made in England for a *re-union* of scientific men from all parts of the world, to take place in August; and it is understood that, in addition to many of the continental *savans*, very many of the scientific men of Great Britain and this country have enrolled their names. It is intended that this meeting shall be held annually, in one of the capitals of the world. By the co-operation of the potentates of the various countries of Europe, Asia and America, the arrangements regarding traveling will be such as hardly to debar, as is often the case, the poorer follower of science from mingling in the brilliant throng of the aristocracy of intellect; it being one of the principal aims of the congress that the rising young men of the day should be by that means introduced to public notice and the great masters of science; drawing out from their obscurity in the nooks and corners of the world—the Linnæuses, Cuviers, Newtons, Koeings, Owens, Murchisons or Browns. The chairman *pro tempore* is the celebrated Professor Simpson, of Edinburgh.

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NEW YORK, SATURDAY, MAY 5, 1860.

COLORING OF NATURE AND ART.

NOW, in the pleasant Spring time, when nature awakes from her winter's repose, and puts on her floral robes, the denizens of our cities and villages seek to enjoy the beauties of rural life in the arrangement of their gardens and the cultivation of flowers. This is a delightful and elevating recreation, for there is implanted in our constitution the same capacity for deriving pleasure from viewing colors by the sense of sight as from drinking-in the strains of music—they impart most pleasure when arranged most harmoniously with regard to their several hues. This harmony is governed by laws with which too many are unacquainted; a few words, therefore, on this topic will not be inapplicable at present.

That which we call *color*, in flowers, is simply their powers of reflecting and transmitting the rays of light which fall upon them. There are three primary colors in nature—red, blue and yellow; and these must always be associated together to produce harmony. On this subject Chevreul, the distinguished French chemist says: "The principal rule to be observed in the arrangement of flowers is to place those which are blue next to those of orange; the violet next the yellow, while red and pink are never seen to greater advantage than when surrounded by verdure, or by white flowers. The latter may also be advantageously dispersed among groups of blue and orange; also of violet and yellow flowers." These associations of color stated by the French author promote harmony and do not offend the taste by the mingling of discordant hues. This is a study which affords wide scope for observation. "Complementary" colors always harmonize; and colors are said to be complementary, when they form a white beam in combination. Thus red and green are complementary, because the latter is composed of blue and yellow, which, with the red, embrace all the primary colors in a ray of light. Crimson and orange are also complementary; and so with other combinations. Green foliage and flowers are complementary, and nature has provided these hues with no miserly hand. Roses and geraniums, with their green leaves are great favorites, and even in mid-winter ripe red berries are frequently seen peeping out from among evergreen bowers, in order to replace with their modest beauty, the sleeping roses of departed summer. Some persons may suppose, from what has been stated, that the green leaves of flowers may sometimes destroy the proper effect arising from the contrast of color; but Chevreul asserts that green leaves are a proper ground for *all* flowers, and never produce discord in the vision.

This subject has lately engaged the attention of some great minds. Sir Gardner Wilkenson, in his recent work "On Color and the Necessity for a General Diffusion of Taste among all Classes," devotes a large space to the arrangement of flowers in gardens, as it regards their color and forms. The principal colors which he recommends are blue, red, pink, purple, lilac, yellow, orange, white and scarlet; and he gives a table covering nine pages, containing the names of many plants with their different colors and periods of blooming. When arranged in beds, he recommends that each plot should have flowers of the same size, and that they should all bloom at the same period. In this view he is correct; yet this is a feature in gardening which is continually overlooked. Large and tall, small and short flowers are frequently planted helter-skelter, in beds apparently upon the principle that profusion is the very essence of beauty. In contracted spaces the flowers selected should be small, while in larger gardens they may be more stately. The reason of this is obvious. A few large flowers, by occupying a large space, must convey an impression of dwarfishness to a small garden, but it is far otherwise when modest little flowers are chosen for their blushing beauty as suitable to such a situation.

The *beautiful* in nature is a gift which may be and should be enjoyed by the humblest as well as the highest. The mechanic's cottage with its little flower-garden may be enriched with all the harmonies of color, and the latter may exhibit in tasteful miniature the best arranged gardens of the wealthy. It affords us pleasure to state that most of our gardeners and many of our ladies and mechanics are well acquainted with the cultivation of flowers, and they exhibit great taste in their arrangement, but very few of them have studied the law of *simultaneous contrast of color*, and hence they frequently place together flowers of colors that produce discord; whereas, by a just arrangement in the same beds, they would produce a more pleasing effect. In regard to the effects of color, we conclude by quoting the following eloquent passage written by Sir David Brewster:—

"He who exhibited such matchless skill in the organization of material bodies, and such exquisite taste in their formation, has superadded that etherial beauty which enhances their permanent qualities, and presents them to us in the ever-varying character of the spectrum. Without this the foliage of vegetable life might have filled the eye and fostered the fruit which it veils, but the youthful green of its Spring would have been blended with the dying yellow of its autum. If the objects of the material world had been illuminated with white light, all the particles of which possess the same degree of refrangibility, and were equally acted upon by the bodies on which they fall, all nature would shine with a leaden hue, and all the combinations of external objects, all the features of the human countenance would have exhibited no other variety than that which they possess in a pencil sketch or a China ink drawing. The rainbow itself would have dwindled into a narrow arch of white light, the stars would have shone through a grey sky, and the mantle of a wintry twilight would have replaced the golden vesture of the rising and setting sun."

THE WAY TO MANAGE AN INVENTION.

There is one inventor conducting his operations in so judicious and common sense a manner that we think an account of his proceedings ought to be widely disseminated as a valuable lesson for others. We allude to Charles T. Porter, the inventor and patentee of the improved governor for steam engines.

In the first place he got a *good thing*. This, of course, is the main step in making money by inventions. Too many patents are taken out for things which have no real value. There is no use in a man's spending money for a patent unless it will facilitate labor, or promote the convenience, or in some manner contribute to the comfort, or tend to gratify the desires of the community. People will not pay a man merely for barren displays of his ingenuity. We cannot urge the point too strongly upon our inventors, to give a wise and *money-making* direction to their faculties.

After a person has secured a monopoly of some desirable article, his next step should be to make such arrangements for its manufacture that he can produce it at the lowest cost, so that it may be offered at fair prices, and still a reasonable profit be left to the inventor and manufacturer. There is no fairer field for cautious and wisely-directed enterprise than this.

The last but not least of the three golden rules for managing an invention consists in *advertising* the perfected article. In this department Mr. Porter has shown not less judgment than in the other two. In the first place, he has selected the paper which comes under the eyes of by far the largest numbers of the purchasers of his peculiar article. Doubtless if he had been advertising for a chambermaid, or for board in this city, he would have selected some one of the daily papers; but for governors for steam engines, it required no extraordinary sagacity to see that the SCIENTIFIC AMERICAN was the proper medium. Observe, too, the character of his advertisements. He does not rest content with the repetition of his own statements, week after week, but presents in every issue a fresh certificate of some disinterested person who has used his governor; thus forming an array of evidence which no man can help believing.

Many patents heretofore taken out have been unprofitable oftentimes for the want of proper management; but if all patentees would observe these three rules—to patent no invention which is not useful—then to produce it at the lowest possible cost, so as to sell it at a fair price—and, finally, to advertise it judiciously and thoroughly—they would make money out of their inventions, with scarcely an exception.

THE RESULT OF THE WATER WHEEL EXPERIMENTS IN PHILADELPHIA.

The long and valuable series of experiments at the Fairmount Water-works, in Philadelphia, are completed, and below we give the results of the better portion of the wheels. No doubt many of our readers are aware that the city of Philadelphia is supplied with water which is pumped up from the rivers; the power of the modern works being supplied by steam, while at the old establishment at Fairmount the pumping is done by water power, a fall of the Schuylkill occurring at that place, varying with the tide from 8 to 14 feet. The authorities having decided to enlarge the works at Fairmount, it was resolved to make a thorough test of the several turbine wheels manufactured in the country, with a view of obtaining the best one for the new pumps. Notice was accordingly given, inviting makers of turbines to send specimens of their wheels to the works to be tested, and these invitations have been very generally responded to by the manufacturers. The experiments were arranged by Mr. Birkenbine, the engineer, in so thoroughly rational and common-sense a manner as to convince every mechanic, as well as every scientific mechanician, that the results were absolutely reliable. The resistance consisted of a box full of stones, which was raised a certain distance, and this distance, multiplied into the weight of the stones, was compared with the weight of the water which flowed through the wheel while the box was rising, multiplied into the fall of the water, which was six feet. Both the wheel and the box of stones were allowed to acquire their full motion before the weighing and measuring commenced, so that the element of inertia does not enter to disturb the problem. In the figures which we publish no allowance whatever is made for friction of the parts which connected the wheel with the resistance. This is estimated by Mr. Birkenbine at three per cent, but as there is no other guesswork in the whole experiments, we prefer to leave this out and to give the actual proportion which the weight raised bears to the weight of the water which fell. It is very easy to add the three per cent for friction:—

Manufacturers.	Kind of Wheel.	Yield of Power.
Addison Monroe, of Worcester, Mass.	Center-vent	.5340
John Tyler, of West Lebanon, N. H.	—	.7120
L. W. Blake, of East Pepperell, Mass.	Center-vent	.7169
Reuben Rich, of Salmon River, N. Y.	Center-vent	.7400
Levi J. Smith, of Reading, Pa.	Parker	.7591
Collins & Co., of Troy, N. Y.	—	.7682
Andrews & Colbaugh, of Brinville, Pa.	—	.8197
Emele Geylin, of Philadelphia, Pa.	Jonval	.8210
E. Stephenson, of Paterson, N. J.	Jonval	.8777

The official report is not yet published, but we have obtained the above figures from sources which give us confidence in their correctness; and the results, especially of the best wheels, have been thoroughly checked and confirmed. Some of the wheels were polished and some were not; and all of these details will be fully explained in the report of the engineer, when we shall lay it before our readers. This is probably the most valuable contribution to the knowledge of practical hydraulics which has ever been furnished by any one series of experiments.

THE POLYTECHNIC INSTITUTE.—It seems that the call we made (in our issue of the 21st ult.) for scientific help to aid the Institute was not kindly received by the president of the club. He calls it "ungenerous," and then goes on to "twit" us of bad grammar in writing *et cetera* after Dr. Stevens' name. He refers pathetically to dictionaries—English and Latin—and says it means "other things" and not "other persons." We do not care to quibble with the learned professor about words; but we presume Noah Webster, L.L.D., to be a tolerable authority in such matters, and we will rest our case on his "Unabridged." We suggest, however, that it might mean individuals or it might mean *geese*. Our call in behalf of the Institute was a good-natured one, and in making it we did not expect to be treated in this cruel manner. Our effort has the true missionary spirit in it, and we shall not be deterred from well-doing by this rebuff We sincerely hope that our former appeal will be heeded, and that the desired relief will be forthcoming.

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AMERICAN POLICE AND FIRE ALARM TELEGRAPH.

During several days last week, Mr. J. N. Gamewell exhibited his above-named apparatus in Tammany Hall, this city, where we examined its mechanism and modes of operation. It consists of more parts than we are able to describe minutely and intelligently without engravings, still it is by no means complicated, considering the various duties which it performs. Its object is to convey intelligence from any of a great number of stations in a city, to a central police station, and from this latter to any and all the stations, in an instant; also to convey information of a fire to the engineer's office, and at the same time set all the alarm bells ringing. Tammany Hall was fitted up with several alarm bells and apparatuses to represent a city laid out with its stations, according to the manner of conducting this system, and the operations were executed with accuracy, to the satisfaction of all present. Supposing a city to be laid out with a signal box at the corner of each street, and that a fire takes place, the policeman on that "beat" turns a small crank in the signal box, and this being connected with the central station by a wire, specific intelligence of the fire is thus conveyed to the place where the chief operator is located. The latter now moves certain keys, and adjusts an escapement to close and break the galvanic circuit as many times as make all the alarm bells strike the number of the district where the fire is. There is no waiting, as is now the case in cities, for the sleepy bell-ringers to take up the alarm, one after another; the whole of the bells in this device are set in operation at once by lightning. Attached to every alarm bell is a striking mechanism, which is governed by a weight like that of a clock. This weight, when wound up, is held by a detent connected with the armature of an electro-magnet; and when the circuit of the galvanic current is closed, the electro-magnet attracts the armature, which relieves the escapement, and the hammer raps the strokes on the bell of the numbered fire district. The operator at the central station not only sets all the signal bells ringing at once, when he receives an alarm, but he also taps back to every signal box in the city the number of the signal box from which the alarm first proceeded. Supposing a fire-engine company to be rushing, by the alarm, to the district indicated, but the *precise* locality of the fire to be unknown; the foreman has but to consult the signal box on the corner of any street, and it will inform him of the very block in which the fire is raging. From the first discovery of a fire until it is signaled through the whole city, and by all the boxes, not more than one minute will elapse. To carry out this system, electric wires radiate from a central station, where the principal mechanism is placed, to all the alarm bells and signal boxes; and the mode by which the exact number of strokes is given to the bells, to indicate the several districts, is very accurate and ingenious.

Each signal box is also furnished with a telegraph key, for police purposes, and by a simple set of signals the police can communicate with the central station, from any part of the city. In short, it provides a system by which the whole fire-department of a city is brought into communication, instantaneously, with a center which receives and communicates in all directions the proper signals, and sets the alarms in operation.

The above system is in practical operation in Boston, Baltimore and St. Louis, and it is now proposed for New York.

EDITORIAL CORRESPONDENCE.

CANALS AND RAILROADS—THINGS OLD AND NEW.

CONSTANTIA, N. Y., April 27, 1860.

Great are the changes which have taken place in commerce, the arts, and the means of public communication, during the past quarter of a century. In the brief period of fifteen hours we have lately been carried from New York—the great hive of incessant turmoil and business—on the shores of the Atlantic, to the distant and tranquil banks of Oneida's blue waters—a journey which occupied us four days and nights, constant traveling, twenty-five years ago. At that period there were only fifteen miles of railroad in operation in New York; this was the old Mohawk and Hudson track, between Albany and Schenectady, over which the first "iron horse" on our continent rolled his metallic hoofs. This railroad was originally built with a long incline at each end, at the head of which were stationary engines for drawing up the trains with endless ropes. This line was first engineered by Peter Fleming, C.E., who laid out the upper sections of New York city, and afterwards became Surveyor-general of Canada. He was a solid mathematician, and considering all the circumstances, this road was a very creditable affair for that day; but it never paid expenses until the inclines were obviated by an improved route which permitted the locomotive to travel the whole distance. Twenty-five years ago, we journeyed up the Mohawk valley on the Erie Canal, which was then the only means of transport for men, merchandise and other *hardwares*. The old packet-boats were towed by horses at the rate of three or four miles an hour. These carried passengers only; their cabins were dressing-rooms by day and bedrooms by night. The sleeping-berths were suspended shelves, which reminded us of the famous couplet of poor Goldie—

"A bed by night; a chest of drawers by day."

In those times this means of travel was not altogether unpleasant. We have tried the modern sleeping-berths on the Hudson River Railroad cars, and we certainly have a happier recollection of the nocturnal snorings when voyaging on "the raging canal," even when counting the probable dangers of shipwreck in doubling "Troy Point," or foundering in the "dubs of Durhup." In those days Professor Morse had not fully harnessed the lightning as man's swift messenger, and the long and tedious mail-carrier was the only public conveyer of news. No quick message of affection in the hour of distress and danger could be heard at a distance; *now*, the tones of filial affection seem capable of being breathed from one end of the land to the other. A few flashes of galvanic lightning recently came to us—three hundred miles in a few seconds; and the iron horse conveyed us the same distance in a few hours afterwards.

In 1835, pine wood was used for fuel by all the steamboats on the Hudson, and huge piles of this combustible material extended far along our docks. Coal was then thought to be an impossible fuel for steam purposes, and as the expense for pine faggots was very great, a number of inventors—such as Davenport and Cook—were then incited to invent electro-magnetic engines to supersede those driven by steam. When the boiler furnaces were afterwards altered on the boats so as to burn coal, electro-magnetism retired from the contest. Our railroads are now going through a similar experience with fuel. A few years since, wood was exclusively used for the fuel of locomotives, and this combustible is still employed to a great extent, but it will soon be completely superseded by coal. We lately made the trip between Albany and New York with a coal-burner, which generated steam as quickly, and made as good time, as any wood-burning locomotive whatever.

The New York Central Railroad—the eastern section of which is the oldest in the State—is one of the best, in every respect, on our continent. The track is well ballasted, and the rails in good order, and the cars slip along as quietly as on most of the famous English railroads. We have gone over this road when it had only a single track, and when most of it was laid with the old flat rail. The original cars were like pigeon coops, in comparison with those of the present day, and the old locomotives—one of which came from England and was called the "John Bull"—were about ten tuns in weight; and they could no more be compared to a first-class engine of the present day than a rough Shetland pony to a splendid Arab charger. The one which carried our express train through was built at the Schenectady Works, of which Walter McQueen, a thoroughly practical engineer, is the superintendent. We left the Central Railroad at Rome, and proceeded on the Watertown track a few miles further north, where we had to take the old-fashioned "stage" for eighteen miles, over shockingly bad roads. The change from the comfortable and swift railroad car to this rumbling, jumbling, jolting, bolting representative of olden times, was enough to cause seasickness on dry land. It occupied as much time to make this eighteen-miles stage-journey as in traveling a hundred miles by railroad. Such are some of the changes and experiences we have witnessed in the means of public conveyance during the past twenty-five years in this section of the country.

INTERESTING ARGUMENT.—We hope none of our readers will fail to read the abstract of Judge Mason's argument in behalf of Professor Morse, which appears in this number. It contains matter of solid interest to all classes, and especially so to the readers of this journal.

WEEKLY SUMMARY OF INVENTIONS.

COMPOSITION FOR ETCHING ON STONE.

The object of this invention is to do away with some very serious defects in the ordinary method of etching stone. The worst defect of this method is founded in the fact that the artist can never know, with certainty, the depth of the lines, and he can only guess the same by the strength of the acid which he employs, by the time which said acid remains on the stone, and by the nature and chemical composition of the stone itself. Another difficulty is caused by the continual stopping out of the finished parts, which completely prevents the artist from seeing the progress of his picture. His memory is his only guide, and this is very apt to confuse and mislead him. Furthermore, the gradation from one tint to the other will always be more or less visible, showing by decided marks the previous covering with acid. All these difficulties are avoided simply by using some acid which forms an insoluble combination with the lines, of the lithographic stone, such as citric acid, which after being washed off with water, leaves a very small quantity of a white powder, viz., citrate of lime, in the lines, which enable the artist to judge accurately of their respective strength by the contrast they form with the dark covering of the stone. The pictures produced by this process resemble steel engravings very closely, and their effect in shade and light is equal in every respect to the best steel engravings. The credit of this invention belongs to Mr. A. Hoen, of Baltimore, Md., who obtained a patent for the same through the Scientific American Patent Agency.

VENEER-CUTTER.

In the cutting of veneers by means of a knife it is essential that the bolts from which the veneers are cut be steamed in order to soften the wood and allow its fibers to be readily parted by the knife; thereby not only facilitating the cutting operation, but also rendering the veneers less liable to break as they are cut. There is, however, one difficulty attending the operation, and that is that, although the bolts, when first placed in the machine after being steamed, are in a condition to be operated upon, they become cool and hard before they are fully cut up into veneers; some time being required to cut up a bolt as the veneers are very thin, and the bolts generally of considerable thickness. The object of this invention is to obviate this difficulty, and to this end, hot water is introduced upon the bolt just in front of the knife during the cutting operation. The invention has also for its object the introducing of the hot water to the bolt in such a way that the means employed for the purpose may also serve as a weight for the bolt to keep the same in proper position during the cutting operation. The inventors of this improvement are G. Koch and A. Stoeckel, of this city.

FEED REGULATOR FOR STEAM BOILERS.

This invention consists in a novel simple and effective contrivance for regulating the quantity of water forced into a steam boiler by a force pump or other feed apparatus, so as to maintain about the same level of water in the boiler under all circumstances, while the supply does not fail at its source, and in case of such failure to give an alarm in time to prevent injurious consequences. This improvement was designed by G. W. Rains, of Newburgh, N. Y.

STITCH FOR SEWING MACHINES.

This invention consists in a stitch of a novel character, produced with a single thread, by passing two loops thereof successively through the same perforation in the fabric to be sewed, passing the second of such loops through the first one, and passing through the second one the first of two similar loops that are passed through the next perforation; such stitch presenting on one face of the fabric the appearance of a plain stitch, and on the other face the appearance of a series of knotted loops. James S. McCurdy, of Brooklyn, N. Y., is the inventor.

GOLD ORE-GRINDER AND AMALGAMATOR.

The object of this invention is to obtain a grinder and amalgamator by which the fine particles of gold that have hitherto escaped in the operation of previously-devised machines may be retained. The invention consists in the use of a stationary pan provided with a central cone, having a discharge opening and gate and a revolving grinder fitted within the pan; the above parts being also used in connection with a stationary frame covered with copper amalgamated plates, the pan being also lined with the same, whereby the desired end is attained. The patentee of this improvement is Israel W. Knox, of San Francisco, Cal.

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DISCOVERIES AND INVENTIONS ABROAD.

Hard Rubber Vulcanization.—A patent has been taken out by George T. Bousfield, of Brixton (England), for making what is called "hard rubber," in articles or blocks of any size, without the addition of any other materials than the india-rubber and sulphur. The raw gum, after being freed from impurities, is kneaded in a heated state with one-half its weight of sulphur, and is then rolled into sheets, or molded into blocks; these are placed in the tanks of a steam heater, and submitted to the action of steam, which vulcanizes them. They are then taken out and broken into pieces and ground in a common hot roller mill. This hard stock is now mixed with one-fourth of its weight of raw gum, and the whole perfectly blended. The mass is now molded into such articles as may be desired, after which they are vulcanized in a steam heater, at a temperature of 280° to 300° Fah., the operation being continued for 8 hours. Common hard rubber contains metallic oxyds, but this inventor states that any degree of hardness or of elasticity may be given to rubber, according to the quantity of sulphur used—the greater the quantity of the latter, the harder will be the compound, and *vice versa*..

Method of Rowing Boats.—In rowing boats, the oarsmen always sit with their backs to the bow, and look in a direction contrary to that in which the boat is moving. As an improvement on this old-fashioned system, Messrs. J. B. Barnes and J. Loach, of Birmingham, have invented a method of operating the oars, by which the rowers can sit with their faces to the bow and row in the same position as formerly, and with a more steady and easy motion. The oars are formed in two parts, with suitable sockets and segmental toothed wheels, which are geared together and secured by a pin in a box. By these segmental wheels the act of carrying the handle part of the oar forward with the body to take a stroke, causes the outer part of the oar to move in the same direction, and it is then dipped in the water in the same manner exactly as is now done by rowing backwards. The row-locks on the boat are arranged with gimbal joints to suit the motion. This arrangement may be very useful for a single rower in a boat, as it will enable him to look in the direction that he intends to steer.

INDUSTRY—MANUFACTURES—COMMERCE.

In western New York, there is an abundance of potatoes selling for 25 cents per bushel. In the city the price is about 75 cents. When the Erie canal opens, it is expected there will be a large amount sent East, by which the prices will be brought down.

Crude whale oil is arriving freely, and selling at 43 and 45 cents per gallon. Sixty tuns of English linseed were sold last week at 61 cents per gall. A considerable amount of oil is now being manufactured from cotton seed—10,000 gallons were lately sold in this city at 52 cents per gallon.

It is remarkable that with all our vast resources of inexhaustible salt springs, we import fine salt in very large quantities from Liverpool, and such is the demand for it, that the supply seldom comes up to meet it. The amount imported last year was valued at $1,124,920.

The Copper Mines of Lake Superior.—The Lake Superior *Miner* gives the most flattering accounts of the mining business in the vicinity of Lake Superior. The product of the Minnesota mine alone, for the month of February, 1860, was 160 tuns, and that in a month when, from the intensity of the cold, the mine was worked only about one-third of the time. The receipts at Ontonagon, since the close of navigation, are 742 tuns. Several new mines will be opened this Spring, from which it is expected that not less than 20,000 tuns of ore will be taken during the season, or $4,000,000 worth of copper alone.

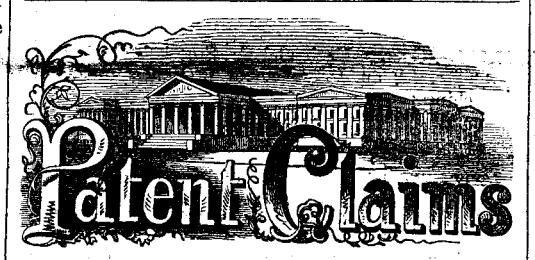
New Observatory at Cambridge.—The Boston *Transcript* states that Mr. Alvan Clark, of Cambridge, Mass., is about to erect new buildings in that city, to be occupied for the manufacture of telescopes, in which art he stands unrivaled on this side of the Atlantic. An observatory for astronomical purposes will be connected with the new establishment.

Gas vs. Oil.—There is a gas excitement at Mendota, Ill., rivaling the oil excitement in Pennsylvania. People dig down 15 or 20 feet for water and instead of that fluid, find a combustible gas, apparently inexhaustible in quantity.

Cotton Mill.—This will be the busiest season ever known in Lewiston, Maine; two large mills, called the Hill mills, being in process of construction, and a large number of blocks for boarding-houses are to be erected. The mill, already commenced, is located at the lower end of the main canal, and is to be 580 feet in length. It will run about 40,000 spindles. The other mill will be of the same size, and will run 24,000.

STEAM ENGINEERING—EXPANSION.

The *Journal of the Franklin Institute* (for this month) contains a review of the second volume of "Engineering Precedents," by Chief-engineer Sherwood, in which the reviewer states that he does "not remember to have seen elsewhere a distinct statement that condensation attends expansion as a condition of the case;" and then the very defective description as to the cause of this is quoted from the work in question. It surprises us that such a statement should have appeared in this old journal. The law of the condensation of steam by expansive working is laid down with mathematical distinctness by Professor Rankine in his work on the Steam Engine, and he states thus "the liquefaction of vapors by expansive working was arrived at cotemporaneously and independently by Professor Clausing and myself in 1849." Its accuracy was subsequently called in question, chiefly on the ground of experiments which show that steam, after being expanded by being wire-drawn, is *superheated* or at a higher temperature than that of liquefaction at the reduced pressure. Soon afterwards, however, Professor M. Thomson found that those experiments are not relevant against the conclusion in question, by showing the difference between the *free expansion* of an elastic fluid, in which all the energy due to the expansion is expended in agitating the particles of the fluid, and, is re-converted into heat, and the expansion of the same fluid *under a pressure equal to its own elasticity*, when the energy developed is all communicated to external bodies, such for example as the piston of an engine."



ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING APRIL 24, 1860.

[Reported Officially for the SCIENTIFIC AMERICAN.]

*** Pamphlets giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

27,956.—G. C. Aiken, of Nashua, N. H., for an Improvement in Cultivator Teeth:

I claim the combination and arrangement of the socket, E, shoulder, B', and journal, B'', with the plate, B, vertical colter, A, flanges or moldboards, C C, and cutters, D D, substantially as set forth.

27,957.—Daniel Barclay, of Chicago, Ill., for an Improvement in Showcase Doors:

I claim the described construction of groove, spring and box; the whole being combined, arranged and operating in the manner and for the purposes specified.

27,958.—John Barnes, of Lima, N. Y., for an Improvement in Broadcast Seeding Machines:

I claim, first, The method described of sowing broadcast, by combining with a wagon or draught vehicle, carrying a seed box or hopper, a seed-circulating and distributing apparatus, constructed to carry or pass the seed from the hopper to and beyond either side of the vehicle, along extended hollow arms or conduits perforated to distribute or let the seed drop as it is circulated, in a current or currents, along the hollow arms or conduits, and the circulation kept up by establishing a vent or return current for the surplus seed, substantially as specified.

Second, The combination and arrangement substantially as specified, for action outside of, but in concert with, a feeding reservoir or hopper, carried by a draught vehicle, of extended and perforated seed distributing arms, or conduits, made capable of projection laterally beyond either side of the hopper, and vehicle or track of the latter, and when not required to sow, of adjustment to within the width of the vehicle, or thereabouts, surplus seed return pipes or conduits, and a conveyor, or conveyors, operating to circulate the seed through the distributing arms and return pipes, and pass it for distribution outside of and beyond both sides of the vehicle simultaneously.

Third, The combination with the hopper, discharge valves or slides c, of the valves or slides, b, to the distributing arms, arranged to operate together and in unison, essentially as shown and described.

Fourth, The combination with the surplus seed pipes, or conduits, of a sieve or sieves, operating to sift the seed, as it is returned from the distributing arms, or conduits, essentially as set forth.

27,959.—L. D. Barraud, of New York City, for a Paper-bag Cutter:

I claim as an improved tool, or improved article of manufacture, a paper-bag cutter, composed of a gage table, A, fixed angular knife, B', angular hinged shear knife, B, and otherwise constructed as shown and described.

[This invention is an improved apparatus for cutting paper for making bags, the object of which is to cut the paper from large sheets in a proper shape and size of which the bag is formed, without waste or loss of time. The invention consists in the use of peculiarly curved knives with an adjustable gage table.]

27,960.—L. A. Beardsly, of South Edmeston, N. Y., for an Improved Bench Vise:

I claim the arrangement and combination of the pivoted jaws, A hinged arms, B, guide-bar, E, recess, c, right and left screw, D, and ring, b, as and for the purpose shown and described.

[This invention consists in interposing a thumbscrew between the two parallel jaws of a peculiar made vise, and fixing it to the screw of the vise, so that it will serve the purpose of adjusting the jaws when used as a wrench; the vice being operated in the usual manner by a loose handle which can be readily taken off to form a wrench.]

27,961.—M. A. Bell, of Rushford, N. Y., for an Improved Method of Tanning:

I claim combining ley with tannic acids in substantially the proportions mentioned, whereby I am enabled to prevent the tanning liquors from becoming decomposed or sour, am enabled to strengthen them without accumulating more than necessary, and can tan skins in shorter time and with less labor than by any other known process.

27,962.—G. T. Bennett, of Mount Olive, N. C., for an Improvement in Corn and Cotton Cultivators:

I claim the curved beam, as constructed, in combination with the straight beam, A, side beam, c, braces, d and e, stocks, a b c, side and double turn plows, F and G, and cotton-scraper, D, the whole being arranged in relation to each other substantially as and for the purpose set forth.

27,963.—G. O. Bishop, of Hannibal, Mo., for an Improvement in Truss Bridges:

I claim, first, The combination of the shoe, G, step, U, and strap or stirrup, H, for the purpose of connecting and securing the arch-chord, D, to its bottom chord, F, in the manner described.

Second, I claim the combination and arrangement of the chord, F, and arch chord, D, with the compound truss, C, arranged as described, whereby the camber of the bridge may be adjusted at any and all points, and the counter braces sustained against the shock of a moving train, or other heavy body, passing on the bridge.

27,964.—S. F. Brooks, of Weston, Mass., for an Improved Infant's Cradle.

I claim the combined cushioned settee and cradle, constructed in the manner set forth, as a new article of manufacture.

[This invention consists in constructing and ornamenting the body and rockers of a cradle, so that it may be used by a simple change for a neat and convenient settee, combining with the same a suitable cushion which will serve as a bed when the article is used as a cradle.]

27,965.—S. F. Brooks, of Weston, Mass., for an Improved Looking-glass or Mirror:

I claim the described and represented combination of a toilet drawer with a looking-glass frame, as a new article of manufacture.

[This invention consists in combining with a looking-glass and frame a draw, which is to be hung within said frame by weights, or other equivalent substitute, in such a manner that the draw may be opened and remain in its opened state by the weights alone; the whole being made in such a manner as to be hung up against a wall in the same manner as those of the present make.]

27,966.—Lyman Brown, James Leland, and John Leland, of Worcester, Mass., for an Improvement in Car Axles:

We claim, first, The quill-box, or bearing, c c, accomplishing the double purpose of connecting and securing the two parts of axle, A and B, and making one of the two bearings, as specified.

Second, We claim the recess, I I, the bearings, F and H, substantially as specified.

27,967.—Levi W. Buxton, of Nashua, N. H., for an Animal Trap:

I claim arranging the spear frame, D, and its operating springs, E E, on rods, C C, extended from the bait platform carrier, A, in combination with arranging the tripping lever, H, and the holding bar, G, on the said posts, and so as to operate with respect to the bait platform and of the brail of the frame, D, substantially as described.

I also claim the arrangement of the series of points or lances, c c, &c., with respect to the bait platform, B, viz., so as to surround it on opposite sides, as described.

27,968.—John Cadwell, of Cincinnati, Ohio, for an Improved Carpenter's Clamp:

I claim, first, The adjustable jaw, A, windlass, C, pinion, g, rack, h, and levers, j, arranged and operated in combination with stops, m, substantially as described and for the purposes set forth.

Second. I claim the stop, n, the swinging piece, p, and the shifting bar, q, arranged as described, and acting in combination with the windlass, C, substantially as and for the purpose set forth.

27,969.—M. R. Chace, of Fall River, Mass., for an Improvement in Casting Molasses Gates:

I claim the arrangement of the two sliding cores or mandrels, the valve seat and bent conduit matrices.

27,970.—E. E. Clark, of New Haven, Conn., for an Improvement in Concrete Walls:

I claim, first, a hollow concrete wall, made as described, by coning out a space between the inner and outer portions, and connecting the parts with isolated binders, as described; the combination of the isolated binders, with the parts of the wall, as shown, forming the necessary connection, while at the same time it does not interfere with the circulation, but allows both lateral and vertical circulation, except so far as the former is obstructed by the flues, which pass upward through the wall, the whole being constructed and operating substantially as set forth.

Second, The combination with a concrete wall made in two parts, as described, of binders which are non-conductors of moisture, substantially as described for the purpose set forth.

27,971.—Alfred Damarin and G. C. Brower, of New Orleans, La., for an Improvement in Construction of Instruments for Lighting Gas:

We claim, first, The combination of the wax taper-helder, with the gas key.

Second, The bending of the taper-holder, so as to light gas through the top of the glass globe.

Third, The placing a flame guard beyond the end of the taper-pipe.

Fourth, The leaving an open space between the said guard and the end of the pipe, all substantially as described.

27,972.—Johan Deckelman and Frederick Spiess, of New York City, for a Fire-escape:

We claim the employment or use of a series of iron ladders, C D E, arranged so as to fold together, all or a portion of them, and be extended as required, and also to swing out from the building, substantially as and for the purpose set forth.

We also claim, in connection with the above, the folding balcony platforms, n, for the purpose specified.

[This invention consists in attaching a series of iron ladders to the side of a building, so arranged that they may be folded together, two or more of them, and turned against the building when not desired for use, and readily turned out from the building and unfolded when required for use. The object of the invention is to afford a ready means of escape for the inmates of a dwelling in case of fire, a means always at hand, and available for instant use.]

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27,973.—F. O. Degener, of New York City, for an Improvement in Printing Presses:

I claim, first, the combination of a rotating ink-distributing table with a rotating reciprocating type bed, for the purpose as described.

Second, I claim the combination of the described mechanism for giving the desired movement to a type bed hinged to a platen; the said mechanism consisting of the revolving shaft, H, passing through the pieces or piece, F, which support and guide the platen; the pieces or piece, F, the alternately rotating reciprocating shaft, f, supporting the type bed, the vibrating supports, L, or their equivalents, the connecting piece, E, or its equivalent; the connecting pieces, M, being attached to the shaft, f, of the type bed at one end and connected at the other end by pins or bolts, set eccentrically to the shaft, H, to wheels, plates or arms attached to the shaft, H.

Third, I claim, in combination with a type bed constructed and operating as described, the eccentric, P, for the purpose of adjusting and varying the linear position of the type bed and platen.

Fourth, I claim the described construction of the card arrangement, operating and for the purpose as set forth.

Fifth, I claim, in combination with the described card gage and gripper, making the end gage entirely separate from the side gage, and attaching the end gage to the platen on the side opposite to the side gage and gripper, for the purpose as described.

Sixth, I claim attaching the frisket or gripper frame to a rotating reciprocating type bed, or to arms projecting from such type bed, in such a manner that the said frisket or gripper frame shall be carried by, and moved with, said type bed; and holding said gripper frame in the desired position when the grippers are not in contact with the platen, and allowing the gripper frame to assume the requisite positions when the grippers are in contact with the platen, and causing them to gripe and hold the paper against the platen, by and through the tension of a spring or springs, only; thus dispensing with cams or stops, generally used for such purposes.

Seventh, I claim, in combination with a type bed and platen, constructed and operating as described, the eccentric pin, bolt or shaft, for the purpose of suspending the taking of an impression.

Eighth, I claim suspending the operation of the card drop motion during the suspension of the impression.

Ninth, I claim the combination of the eccentric pin, bolt or shaft with a card drop motion, for the purpose of suspending the operation of such card drop motion.

Tenth, I claim suspending the taking of an impression, and suspending the operation of the card drop motion, by and through one and the same means.

Eleventh, I claim the combination of a type bed, operating as described, with the stationary ink roller supporters.

27,974.—Darwin Ellis and Philander Hine, of Waterbury, Conn., for a Portable Match Case:

We claim the combination of the slotted case, a, revolving shaft, b, having the wings, 3 3, and the cross slide and delivering finger, 6, substantially as set forth.

27,975.—J. F. Eylar, of Scott, Ohio, for an Improvement in Cultivators:

I claim the described arrangement of the plows, E F, frames, G, links, H, chains, I, standards, K, levers, L, chains or rods, d, pulleys, M N, and crank shaft, O P, constructed and operating in the manner and for the purpose set forth.

27,976.—H. W. Farmer, of Poultney, Vt., for an Improved Window-blind Slat Machine:

I claim the combination of the guide rods, Q T U V W X, adjustable on one side of the machine and yielding or elastic on the other, constructed, arranged and operating substantially as described, with the double sets of feed rollers, k k k k, all situated in front of the first cutter head, for the purposes specified.

I also claim the adjustable cutter heads, S S, for perfecting the beaded edges, of the shades, when arranged in combination with the guide rods, Q T U V W X, and pressing block, J, substantially as described, so as to receive the shades in proper position directly from the side-dressing cutter heads without intermediate manipulation or machinery, and to finish them with unerring accuracy in their continous and direct course through the machine.

26,977.—Myron Fox, of Stamford, Conn., for an Improved Method of Insulating and Supporting Lightning Rods:

I claim the insulator formed in two or more sections, D d E e, matched together, in combination with the hinged supporter, A B C, or its equivalent, made to operate substantially as and for the purpose set forth.

27,978.—S. M. Fox, of New York City, for an Improvement in Tracks for City Railroads:

I claim the arrangement of the grooved and flat rails for city railroads, combined with the cylindrical and flanged wheel for the cars, in the manner and for the purposes set forth.

27,979.—Henry Giffard, of Paris, France, for an Improved Feed-water Apparatus for Steam Boilers. Patented in England, July 23, 1858:

I claim the method of supplying vessels under pressure with any non-elastic fluid by the direct action of steam or other gaseous fluid, also under pressure, when this fluid is brought into contact with and enters the aforesaid vessel, along with the non-elastic fluid, to which it has first given the necessary force to overcome the resistance, substantially as described.

Second, I claim the general construction, arrangement and combination of apparatus for forcing water or other liquids, by the direct action of a jet or jets of steam or other gaseous fluid, substantially as described.

27,980.—Robert Hawkins, of Bealsville, Pa., for an provement in Beehives:

I claim the trap, I, when constructed with a stationary grating, f, and a removable glass window, g, at its back, and arranged on a beehive as and for the purposes described.

27,981.—A. Hoen, of Baltimore, Md., for a Composition for Etching Stone:

I claim the employment, as a mordant for lithographic stones, of a composition of gum arabic, or its equivalent, with citric acid, or some other acid forming a combination insoluble in water, with the lime of the stone, substantially in the manner specified, so as to produce what I term the "lithokaustick" method of etching stone.

27,982.—Richard Hornbrook, of Cincinnati, Ohio, for an Improvement in Running Gear for Railroad Cars:

I claim the supplementary axles, C, and eccentric wheels, D, arranged and combined with the running gear of a railroad car, substantially as and for the purpose set forth.

27,983.—H. C. Hunt, of Ottumwa, Iowa, for an Improvement in Bench Planes:

I claim combining the metallic swinging strap, e, with the bits of said plane, substantially in the manner and for the purpose herein set forth.

27,984.—James Ives, of Mount Carmel, Conn., for an Improvement in Harness Pads:

I claim, first, In the construction of a harness pad, detached from the tree or housing, the combination with the perforated pad plate, A, of a U-shaped washer plate, B, which has rivets or hooks formed on it, and is arranged within the pad and below the perforated pad plate, substantially as and for the purposes set forth.

Second, Confining the back band loop in position, by combining it with a detachable T-bolt, F, of the pad plate, A, substantially as and for the purposes set forth.

Third, Closing-up and confining one end of the pad by the combined agency of the back band loop, G, and the T-bolt, F, substantially as and for the purposes set forth.

Fourth, Providing the cap, G′, with a band or loop, f, and with lugs, d d, and using it in combination with a tree, E, which has shoulders, e e, formed on it substantially in the manner and for the purposes described.

27,985.—James Jenkinson, of Brooklyn, N. Y., for an Improvement in Ventilators for Hats:

I claim the combination with the crown of a hat of a ventilator, V, constructed and operating substantially in the manner and for the purposes specified.

[This invention consists in arranging in the inner side of the crown of a hat a series of wings or fans attached to spring arms which emanate from a perforated hub, in such a manner that the motion imparted to the fans, by the motion of the person wearing the hat, serves to expel the foul air from the interior of the hat through the opening in the hub, and to create a sensation of coolness to the head of the person wearing the hat.]

27,986.—W. D. Jones, of Dayton, Ohio, for an Improved Method of Adjusting the Planes in Molding Machines:

I claim the arrangement of the shafts, A B and T, in their relation to each other and to the parts of the machine to which they are connected—the two first-named shafts being susceptible of both vertical and lateral adjustment as set forth.

[This invention will be clearly understood by box-makers, in reading the above claim.]

27,987.—L. B. Joyner, of Hilliardston, N. C., for an Improvement in Cotton-thinning Plows:

I claim the arrangement of the shares, i h, revolving cutters, g g, frame, A, driving wheel, b, and gear wheels d c, substantially as and for the purposes set forth.

27,988.—Seligman Kakeles, of New York City, for an Improvement in Fluid Lenses:

I claim the application and use of a magnet, or its equivalent, in the bottom of a glass globe filled with a colored fluid, for the purpose as set forth.

27,989.—A. Kane and N. Kane, of New York City, for an Improvement in Harvesters:

We claim so combining a lever, that extends from the conductor's seat, with a ratchet and pawl, by means of a hinged arm, m, or its equivalent, as that the driver or conductor, from his seat, may throw said pawl out of action with said ratchet, entirely, and when the machine is in motion or otherwise, and yet admit of said pawl slipping over the ratchet when in gear with it, and when the machine is backed, substantially as described.

We also claim, in combination with the shoe plate, P, and shoe, U, the latter of which is secured to the finger bar, and the former to the braces, Q and R, the set screws, p p, one on each side of the hinge joint, for the purpose of making a rigid connection between the finger bar and the shoe, when the machine is to be converted into a reaper, substantially as set forth.

We also claim making the track-clearer of a harvesting machine in two sections, when the same are hinged together in such a manner that they act like a stiff track-clearer when the machine is moved forward, but that the lower section may swing on the hinges and yield, when the machine is backed, substantially in the manner described.

27,990.—I. W. Knox, of San Francisco, Cal., for an Improvement in Amalgamators:

I claim, first, The grinder, D, constructed and fitted within the pan, B, to operate as and for the purpose set forth.

Second, The conical projection, C, provided with a discharge opening, a, and gate, b, and having a central position within the pan, B, to serve as a hub for the grinder, D, substantially as shown and described.

Third, The employment or use of the frame, J, fitted within the pan, B, and covered with amalgamated plates, and used with or without the lining of amalgamated plates for the pan, substantially as and for the purpose set forth.

Fourth, The combination of the pan, B, with its central projection, C, and gate, b, the grinder, D, and frame, J, covered with the amalgamated plates, substantially as and for the purpose specified.

27,991.—George Koch and A. Stoeckel, of New York City, for an Improvement in Veneer-cutting Machines:

We claim the employment or use of the tubular slotted bar, I, being directly in front of the knife, in the way substantially as shown, so as to perform the double function of a weight for the bolt and a hot water conductor.

27,992.—Adolphus Lippman, of New York City, for an Improved Fire-escape:

I claim, first, Arranging in the center of the extension ladders, D D′, a covered passage, G, substantially as and for the purpose described.

Second, The combination with the covered passage, G, of the platform, J, and the sliding carriage, H, constructed and operating substantially as and for the purpose specified.

Third, The arrangement of the inclined posts or standards, C, in combination with the frame, F, of the ladders, D, and the windlasses, E—constructed and operating substantially in the manner and for the purpose set forth.

[This invention consists in arranging in the center of an extension ladder a covered passage, in such a manner that persons in a building which may be on fire can be passed down through said passage, without danger of being burnt or injured by falling bodies. It further consists in combining with said covered passage a platform on the top, and a sliding car with a windlass, in such a manner that when the ladders are extended and the car is raised, the platform enables persons to step into the car from a window or any other elevated place, without danger of being precipitated to the ground. It also consists in combining said ladders with an inclined post and with one or more windlasses, in such a manner that the ladders can be brought into a horizontal or into an inclined position with the utmost facility.]

27,993.—J. S. Lloyd, of Salem, N. J., for an Improvement in Buckets for Removing Coal, &c.:

I claim the application and use of a slide on the bottoms of self-adjusting buckets, as well as its particular construction and arrangement in connection with the spring, S, by means of which the bucket is made to open and close itself.

27,994.—J. S. Lloyd, of Salem, N. J., for an Improvement in Machines for Hoisting Hay, &c.:

I claim the construction, combination and arrangement of the fork, bucket, cords, levers, pulleys, springs and railway, the arms, E E, to the block, D, and the mode of attaching and supporting the railway to the barn or frame so as to allow the wheels, B B, with the attached blocks and fork or bucket to pass freely along the whole length of the rail.

I also claim the post, P, as constructed, in combination with the pulley, lever, slide, spring and cord.

27,995.—Michael Massey, of Cleveland, Ohio, for an Improvement in the Construction of Candle Machines:

I claim the combinotion and operation of the several devices, viz: the split pipe, P, the right and left screw, S, the springs in the sliding frame, A, the knife, K, the receiving boards, H, and the drum, G, as described and operating for the purpose set forth.

I also claim the continuous split pipe to form a steam chamber or ice box as specified.

27,996.—Levi Matthews, of Antrim, Ohio, for an Improvement in Pumps:

I claim the employment of a reciprocating cap-board, disk or vane, immersed in the water of the well and operating conjointly with the plunger, in combination with a stationary receiving valve or valves to the pump, arranged to face said cap-board, or thereabouts, and so that the cap board plays to and fro above said valve or valves, substantially in the manner and for the purpose or purposes herein specified.

27,997.—Gregor Menzel, of Milwaukie, Wis., for an Improvement in Fire-proof Safes:

I claim, first, The revolving book-stand, F, within the revolving cylinder, E, and the outer cylinder, B, there being an air space, X, between the book-stand and cylinder, E, and between the two cylinders, B and E, and the parts named being constructed and arranged as set forth.

Second, The convex top and bottom, P P, of the outer cylinder, in combination with the projections, U, thereon, for the purposes described.

27,998.—W. H. McCoy, of Wheeling, Va., and J. F. Muth, of Grafton, Va., for an Improvement in Window Sashes:

We claim the employment, in combination with a sash formed of divided lights or numerous panes, of separately detachable pane-holding frames, C C, constructed and applied to fit the sash, essentially as specified, for the purpose of retaining the glasses in their places, and to admit of the easy and speedy separate removal thereof; also forming a readily transportable means for measuring or sizing the panes, substantially as shown and described.

27,999.—J. S. McCurdy, of Brooklyn, N. Y., for an Improved Stitch made by a Sewing Machne:

I claim the stitch produced with a single thread by passing two loops thereof successively through the same perforation in the fabric to be sewed—passing the second of these loops through the first one, and passing through the second one the first of two similar loops that are passed in the same manner through the next perforation, substantially as herein described and represented in the accompanying drawings.

28,000.—M. C. McCullers, of Herndon, Ga., for an Improvement in Plows:

I claim the arrangement of the handles, beam and brace, and their several connecting parts, so as to make a plow stock that will admit of the changes, or receive the plows or mold boards stated and in the manner set forth.

28,001.—Samuel Maxwell, of Baltimore, Md., for an Improved Composition for Removing Gum from Machinery:

I claim the composition of ingredients and the process of admixture thereof substantially as set forth, and for the purposes specified of removing gummy matter from machinery, &c.

28,002.—A. H. Miller, of La Porte, Ind., for an Improvement in the Construction of Rotary Evaporators:

I claim the rotary evaporator, A, with the compartments, 1 and 2, constructed and operating substantially as set forth.

28,003.—James Montgomery, of Baltimore, Md., for an Improved Combined Salinometer and Water Gage for Steam Boilers:

I claim, first, A hollow float, F, having a hollow arm, e, which communicates with the atmosphere, when said float and arm are so arranged that any water which may leak or insinuate itself into the float will automatically, or by its own gravity, flow out or discharge therefrom, substantially as set forth.

Second, The combination of window, c, and indicating arm, g, when so arranged that the visible level of the water will act to show the hight of the same, substantially as and for the purposes set forth.

Third, The hydrometer scale, h, attached to the end of the indicating arm, g, and arranged at the side of the window, c, so that the amount of saturation of the water with salt or other mineral may be easily read without the aid of a meter, substantially as set forth.

Fourth, Making the axial box or bearing of the float arm with an alarm passage, m, in combination with the providing of a similar passage in the flanch, e, of the hollow arm, when the joint between the hollow arm and its axial box is made tight by the internal pressure of the steam of the boiler, substantially as set forth.

28,004.—James Montgomery, of Baltimore, Md., for an Improvement in Railroad Car Axles:

I claim, first, A shaft or axle constructed substantially as described.

Second, In combination with the same a central brace or braces, D, movable journal thimble, B, and cast iron hub, substantially as set forth.

Third, The openings, E, between the circumference of the axle and the thimble journal, B, and through the body of the metal composing the journal box, substantially as and for the purposes set forth.

28,005.—C. P. Morton, of Philadelphia, Pa., for an Improvement in Sawmills:

I claim the arrangement of the trucks, A A′, and A″ A‴, respectively, with each other and with the track rails, C C, and roller, h, in relation to the saw, d, as set forth—the same operating together in the manner and for the purpose described.

28,006.—D. R. Nelson, of Jackson, Ohio, for an Improved Machine for Adding Numbers:

I claim the combination of the keys, B, adjustable brackets, g h, hinged lever, F, and pawl, G, operating through the ratchet wheel, D, on the index, C, substantially in the manner and for the purpose explained.

28,007.—Septimus Norris, of Philadelphia, Pa., for an Improvement in Guide Wheels for Locomotives:

I claim, first, The application of two radial bars jointed to the frame of the guide wheels, and working with four centers.

Second, The compound curved block in connection with the roller for supporting and guiding the wheels through curves, at the same time holding them rigid in a straight line of rail.

28,008.—E. M. Noyes, of Newark, N. J., for an Improvement in Combs:

I claim, as an improved article of manufacture, a comb which is provided with a back piece, Q, in the manner described; the said back piece being made of a single piece of horn bent across the grain, so that the grain of the horn shall cross the back of the comb, substantially as set forth.

28,009.—James Peeler, of Tallahassee, Fla., for an Improvement in Seeding Plows:

I claim the general arrangement of the bars, C and D, as constructed, the catch, C, blade, H, clevis, L, beam, A, upright, K, handles, T, hopper, J, and wheels, B and B′; the whole being used for the purpose of forming a seeding plow, substantially as set forth.

28,010.—W. P. Penn., of Belleville, Ill., for an Improvement in Rakes for Harvesters:

I claim the levers, F and O, rigidly connected together and loosely pivoted at e, in combination with the crank, H, connecting rod, D, shaft, P, and guide rods, b b, grooved shoe, I, and platform, C; the whole constructed and arranged substantially as described.

28,011.—G. W. Rains, of Newburgh, N. Y., for an Improved Feed-water Apparatus for Steam Boilers:

I claim the combination of the cylinder, A, connected with the boiler, as described, the piston, D, having a hollow rod, the valve, F, having an attached rod passing through the piston and its hollow rod, the rotating disk, I, furnished with a pin, f, and projecting rim, g, the griper, G H, or its equivalent, and the rod, L, suspended from the piston rod, the whole applied in connection with the cock, N, in the suction pipe, or its equivalent, to operate substantially as described.

And in combination with the above-specified apparatus, I claim the alarm cock, V, applied in connection with the rod, L, to operate substantially as set forth.

28,012.—Robert Ramsden, of South Easton, Pa., for an Improvement in Pumps:

I claim the combination of the plunger, E, constructed as described, with the chambers, B and C, the stuffing boxes, a a a a and d d d d, and the valves, f and g, substantially in the manner described and for the purposes set forth.

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28,013.—George Rugg, of Potsdam, N. Y., for an Improved Bullet Ladle:

I claim the construction of the ladle with an aperture, A, and the lever, B, to close the aperture at A, and to operate substantially as described.

28,014.—W. B. Scaife, of Pittsburgh, Pa., for an Improved Metallic Cask:

I claim a cask, barrel or keg made of sheet iron, having its sides corrugated longitudinally, in the manner described, to produce a bilge and leave the parts near the heads plain, and united with the heads by lap-joints, which extend beyond the heads in the form of a chime, as described.

28,015.—L K. Selden, of Haddam, Conn., for an Improved Portable Swing:

I claim the combination of slotted base pieces, A A, extension-jointed rods, C C and C′ C′, braces, D D, with the crossbar, G, and elastic swinging bars, b b′, with basket, J, all arranged substantially in the manner and for the purpose set forth.

[The object of this invention is to construct a cheap swing, with standards for supporting it with suitable base pieces for keeping the parts erect in such a manner that the whole may be folded up into a very compact compass when not in use, and so that the parts will possess strength, the standards rigidity, and the whole portability and lightness.]

28,016.—I. R. Smith, of Elgin, Ill., for an Improvement in Cultivators:

I claim the combination of the long standards, A and A′, the check or guard pieces, E, the movable handles, N, the saddle, P, for the beam, B, to roll upon; the truss, G, consisting of the pieces of iron, S, the standards, G G, the rod, Y, the stretcher, Y′, the iron brace, K, and the joint, M, attached to the two-wheeled carriage, O, as described and for the purposes specified.

28,017.—Wm. Somerville, of New York City, for an Improved Device for Preventing Horses' Feet from Interfering:

I claim providing the foot of a horse with a pad inserted and attached substantially as described, for the purpose set forth.

28,018.—Otis W. Stanford, of Cincinnati, Ohio, for an Improvement in Horse-powers:

I claim the combination of the rotary platform, C, axle beam, D, cogged driving wheel, E F, pinion shaft, N P, hinge, c, and slotted socket, M m, constructed, arranged and operated in the manner and for the purposes explained.

28,019.—Calvin Stowe, of Braceville, Ohio, for an Improvement in Corn Shock-binders:

I claim the sliding handle, C, hook, E, and knot, f f f, as described, for the purposes specified.

28,020.—G. C. Taft, of Worcester, Mass., for an Improvement in Letter-copying Presses:

I claim casting the platen, D, and tubular piece, E, in one piece and at a time, in combination with forming the screw, a, by coreing, as and for the purpose set forth.

I also claim the combination of a single platen piece, D E, and screw, a, with screw, F, arch piece, C, shoulders, c d, and socket, b, all arranged and operating in relation to each other, as and for the purposes set forth.

28,021.—G. W. Tolhurst, of Liverpool, Ohio, for an Improved Washing Machine:

I claim the cords, H H, in combination with the shaft, D, and rubber, C, the whole being combined and arranged for the purposes set forth and specified.

28,022.—Richard Ten Eyck, Jr., of Brooklyn, N. Y., for an Improved Machine for Enameling Moldings:

I claim the employment or use of plates or hoods, L N, in connection with scrapers, M K, arranged to operate substantially as and for the purpose set forth.

I also claim, in combination with the scrapers, M K, and plates or hoods, L N, the brushes, T, for the purpose specified.

28,023.—T. P. Trott, of Washington, D. C., for Improved Labels for Mail Bags, &c.:

I claim, first, A label plate, so fastened by one or both of its ends to a mail or other bag, package box or other thing, as that, whilst it is permanently attached thereto, it may nevertheless be turned thereon, substantially as described, when said plate is furnished with a shield, panel or raised fillet, flange or projection, as set forth.

Second, I claim, in combination with such a label plate that is permanently attached to the bag, package or box, and is furnished with such a shield or panel, the attachable and removable labels, such as described and represented.

28,024.—Jonas Underkofler, of Philadelphia, Pa., for an Improvement in Hand Trucks:

I claim combining the movable hooked rods, H, and the annular piece, G, with the frame of the truck, substantially in the manner and for the purpose set forth.

28,025.—A. C. Vandyke, of Greenupsburg, Ky., for an Improved Apparatus for Heating Ore:

I claim the described arrangement of the open-work grate or basket, E, conical open-work gate, F, rod, G, lever, H, and doors, D and D′, in connection with the tunnel head, A, the whole being constructed, combined and operated in the manner and for the purposes set forth.

28,026.—J. A. Vaughn, of Cuyahoga Falls, Ohio, for an Improvement in Grain Separators:

I claim arranging the grain board, T, screen, U, and cockle board, Z, so as to incline in the direction of the length of the machine while the series of zigzag screens and their boards incline toward the sides of the machine, as described, so that, while the chaff is delivered at one end of the machine, the cockle and the screenings shall be delivered at the opposite end thereof, substantially as described.

28,027.—John Waugh, of Elmira, N. Y., for an Improved Machine for Cutting Sheet Metal:

I claim, first, The sheet head, Fig. 2, composed of the table, E with its tongued rails, v, and pieces, 5, carrying the perforated lugs, 6, the gage rods, r, the clamp, 2, with its springs, 4, and the gage plate, t u, when constructed and arranged substantially as described.

Second, The combination of the rotary clamp head, Fig. 3, and of the said sheet head connected with its carriage, D, Fig. 1, severally with the groove, K, and rotary shears head, B, when they are arranged as described.

28,028.—R. T Wilde, of New York City, for an Improvement in the Manufacture of Bonnet Frames:

I claim the peculiar method of arranging and uniting the front, head and stay wires, as set forth, by means of which the manufacture of bonnet frames is not only facilitated, but a uniformity in the stiffness and thickness of the front wire is thereby secured.

28,029.—Thomas Windell (assignor to himself and G. R. Couvon), of New Albany, Ind., for an Improvement in Tombstones:

I claim manufacturing tombstones or monuments of glass in which inscriptions may be impressed, substantially as and for the purpose specified.

28,030.—W E Worthen, of New York City, for an Improvement in Metallic Sashes:

I claim the combination of metallic bars with bent pieces t sheet metal, constituting shoulders, against which panes of glass may rest and with sheet metal bosses, when the whole are joined each to the other, substantially in the manner set forth, and constituting a metallic sash, substantially such as described.

28,031.—G. H. Wood, of Green Bay, Wis., for an Improved Machine for Crushing Stones:

I claim the solid shaft, D D′ d, on two axes meeting at a point below the roller, E, and slightly separated from each other above said roller.

I also claim the construction of the roller, E, in the shape of two truncated cones, and the mode of combining, adjusting and operating the same with the shaft, D D′ d.

I also claim the combination and arrangement of the shaft, D D′ d, and the crushing roller, E, with the crushing box, B, when used and operated substantially as specified, for the purpose of crushing (without grinding) stone, quartz, or any other material which can be crushed or pulverized by pressure.

28,032.—B. H. Wright, of Rome, N. Y., for an Improved Steam Boiler:

I claim the arrangement described for promoting the centripetal movement of the water, and the durability of the horizontal water tubes, by cutting off the direct communication between the steam chamber and end of the tubes nearest the feed pipe.

28,033.—G. W. Blake (assignor to himself and L. W. Blake), of Pepperell, Mass., for an Improved Belt Fastening:

I claim the employment of two eyed loops or links, B, in combination with rods, C, substantially as and for the purpose described.

[This belt fastening is very simple and effective, nothing being required except two rods of thin wire and a number of loops or links to retain them, and both the rods as well as the links can be used over and over again, so that not only much time is saved in lacing the belts, but the expense of buying new lacing is also dispensed with.]

28,034.—Charles Branwhite, of Williamsburgh, N. Y., assignor to Charles Knox, of New York City, for an Improved Hat Rack for Cigars, &c.:

I claim the described cigarrack for hats, constructed and applied in the manner substantially as described.

[This invention consists in applying to the inside of a hat a rack for holding cigars, &c., which is constructed hoops of reed, whalebone or other like substance combining elasticity and stiffness, to which is applied strips of india-rubber, which are attached to the hoops at suitable intervals by metal clasps forming loops, which, on account of their elastic properties, will receive and hold cigars, or the like, in the hat. The hoops are attached at their points in such a way that they may be constructed or extended for fitting hats of any size.]

28,035.—W. J. Cantilo (assignor to Stuart & Peterson), of Philadelphia, Pa., for an Improvement in Stoves:

I claim the combination of the chamber and cap, the latter having inclined or curved ridges provided with slits, in the manner and for the purpose specified.

28,036.—T. R. Dunham (assignor to T. B. Peddie and John Morrison), of Newark, N. J., for an Improvement in Traveling Bags:

I claim, as an improved article of manufacture, a traveling bag, having its interior provided with springs or elastic strips that are capable of being turned, as shown and described, so as to distend or not distend the sides of the bag as desired, all as set forth.

[This invention relates to an improvement in that class of railroad or traveling bags which are constructed of two parts connected by a joint, the body or sides of the parts being formed of some textile fabric, thin leather, or other flexible or yielding material.]

28,037.—T. G. Harold (assignor to himself and J. H. Harold), of Brooklyn, N. Y., for an Improved Needle Case:

I claim, first, A needle case having a turning cover, or its equivalent, with an opening for the delivery of a needle or needles from one of the receptacles of said case, substantially as specified.

Second, In combination with said case and turning cover, I claim the ratchet, e, and indicating numbers around such case, for the purposes set forth.

28,038.—H. A. Jones (assignor to E. H. Dewey), of St. Louis, Mo., for an Improved Machine for Finishing Wooden Boxes:

I claim, first, The endless traveling apron, B, with clamping jaws, a a a a, arranged and operating as set forth, with relation to the rotary saw and cutter head, D D E, the whole operating in the manner and for the purpose specified.

Second, The adjustable guide plate, G, carrying chamfering cutters, I c, and smoothing cutter, H, as shown and described.

Third, The beveled chamfering cutters, g g, arranged with relation to the traveling apron, B, and guide plate, G, as set forth and for the purposes described.

28,039.—Frederick Kaveman, Charles Kavemann and Bannert Hoerstmann, of Cincinnati, Ohio, assignors to Frederick Kavemann aforesaid, for an Improvement in Extension Ladders:

We claim the described combination of the disconnected jack, F f, with the sliding and detachable sections, 1 2 3 4 5, clips, A, hooks, B, stops, C, brace, D, and jack, E, the whole being constructed and arranged and operated in the manner and for the purposes set forth.

28,040.—F. C. Meyer (assignor to E. Meyer), of Philadelphia, Pa., for an Improved Machine for Copying Figures, &c.:

I claim, first, Forming on a block or plate of steel, or other material, a fac simile of a given pattern, by attaching both block and pattern to a movable table, I, in the described position, in respect to a revolving drill, e, and stationary tracer, q, imparting to the table a continuous pressure toward the drill or cutter by means of the weighted arm, M, and its roller, Q, or their equivalents, and connecting the table to such a system of slides that it can be moved vertically and transversely, as set forth.

Second, I claim so constructing the tracer, q, and so connecting it to the frame, that it may be adjusted therein in respect to the point of the drill, e, and in a line with the center of the drill's rotation, as and for the purpose set forth.

Third, I claim the circular plates, K and K′, arranged to turn simultaneously on the table, I, by operating the screw, J, the whole being combined with the revolving cutter or drill, e, the stationary tracer, q, and the weighted arm, M, or its equivalent, as and for the purpose specified.

Fourth, The anti-friction rollers, n and n, when applied to the longitudinal and dovetailed projection, i, of the slide, H, and the dovetailed recess of the table, I, substantially in the manner and for the purpose set forth.

28,041.—S. J. Seely, of Buffalo, N. Y., assignor to C. W. Durant, of New York City, for an Improvement in Railroad Cars:

I claim the application to the construction of the bodies of railroad cars and other vehicles of metal plates, corrugated into a continued series of direct and reversed arches, and secured together by and upon the angle irons, a b c d, and the trough irons, E, as set forth, whereby a greater degree of strength in the vehicle, to bear weight or resist pressure, is secured, than has ever before been attained with the same weight of material.

28,042.—Bradford Stetson, of Uxbridge, Mass., assignor to himself and Elmer Townsend, of Boston, Mass., for an Improvement in Skates:

I claim the application of the single windlass, C, the worm gear, D, and operating screw, F, and shaft, E, within the foot-rest, B, of the skate, substantially in the manner and so as to operate both fastening straps, G H, simultaneously as specified.

And I particularly claim the application of each loop to the windlass and foot-rest, so as not only to embrace opposite sides or parts of the foot-rest, but so that both parts or end portions of the loop may wind at one and the same time on the windlass while it may be in the act of being revolved.

28,043.—J. H. Woodward, of Nashua, N. H., assignor to W. W. Dutcher & Co., of Milford, Mass., for an Improvement in Temples:

I claim making the temple trough with a close inner end or a bar, or analagous contrivance, extending across the the temple, and with respect to the inner end of the cylindrical roller and the upper edge of the sides of the trough, substantially in the manner and for the purpose set forth.

RE-ISSUES.

S. B. Hunt, of New York City, assignee of H. B. Adams, of Brooklyn, N. Y., for an Improved Automatic Boiler-feeder. Patented Jan. 4, 1859:

I claim, first, The oscillation of the chambers, L L′, by the gravity of the water, for the purpose of alternately filling the chambers and emptying their contents into the boiler, as set forth, when the said chambers are combined with the arrangement of means for filling and emptying them, as described.

Second, The combination of the chambers, L L′, oscillated as described, with the cylinder, C, and shell, K, constructed as set forth, for the purpose of producing a communication between one of the chambers and the interior of the boiler at the same time that a communication is produced between the other chamber and the tank, F, to allow one chamber to be filled with water from the tank, while the contents of the other chamber is being emptied into the boiler.

Third, The combination, with the chambers, L L′, oscillated as described, of the pipe, D, to govern the movement of the chambers, as set forth.

Moses Marshall, of Lowell, Mass., assignor to George Crompton, of Worcester, Mass., for an Improvement in Looms for Weaving Figured Fabrics. Patented Dec. 11, 1849:

I claim combining with the jacks that operate the series of leaves of heddles, and with the lifter and depresser and pattern chain, or any equivalent apparatus for determining the pattern, a mechanism for holding the jacks either in their elevated or depressed condition when not required to be operated, substantially as and for the purpose specified.

I also claim imparting an irregular motion, substantially as described, to the jacks, by means of eccentric cog wheels, substantially as and for the purpose specified.

Clark Tompkins, of Troy, N. Y., for an Improvement in Knitting Machines. Patented Dec. 23, 1856:

I claim the improvement of driving the rough roller, A, of the specified take-up mechanism of a rotary knitting machine, by means of the friction apparatus set forth, or their mechanical equivalents, substantially in the manner and for the purposes described, instead of giving a positive rotary motion to this roller, as heretofore; so that this draft roller, with its incumbent take-up roller, B, by the combination of a friction driver, without any additional mechanism or any re-adjustment, continually gives the same tension to the web in knitting, however much the yarn varies in size, or whether much or little yarn is feed to the needles, or whatever quantity of web is on the take-up roller.

T. R. Hartell, of Philadelphia, Pa., for an Improvement in Apparatuses for Making Glass Stoppers for Bottles, &c. Patented Oct. 19, 1859:

I claim forming the projections on the cap of the vessel by means of the radial punches, or their equivalents, and the vertical recesses on the plunger or die, which recesses allow the said plunger to be withdrawn after the formation of the projections, as set forth.

EXTENSIONS.

R. E. House, of Binghamton, N. Y., for an Improved Magnetic Letter Printing Telegraph. Patented April 18, 1846; re-issued Sept. 20, 1859:

I claim, first, A series of keys, each corresponding to a character, in combination with a revolving part of a circuit, so that the touching of one of the former may cause circuit to be broken or closed for the purpose of printing, substantially as specified, when the revolving parts of the circuit is in a certain required angular position properly corresponding to the key struck.

Second, I claim a series of keys, each corresponding to a character, in combination with a revolving portion of a circuit and a shaft provided with pins arranged in a helix, all substantially such as specified, or the equivalents of the whole acting to cause circuit to be broken or closed when the revolving part is in a certain angular position, in proper correspondence with the key struck, for the purpose of printing a proper corresponding letter by means of any suitable machinery.

Third, I claim a key board or series of keys, in combination with a rotary portion of a circuit, and a type wheel, or its equivalent, so governed as to present a proper letter, corresponding with a key touched, to produce an impression; the combination being substantially such as set forth.

Fourth, I claim, in combination, a single circuit of conductors, a key board or series of keys, a revolving portion of a circuit and a type wheel, substantially such as specified, and these also in combination with a printing press and with a key shaft, or either of them, each part being substantially such as described.

Fifth, I claim a series of keys, each corresponding to a character, in combination with a type wheel having similar corresponding characters, both substantially as specified, when so connected by any appropriate devices that a certain type shall be in a certain locality when a corresponding key is actuated; and I claim these two elements in combination with a single circuit of conductors and with a printing apparatus, or either of them.

Sixth, I claim actuating or driving a revolving portion of a circuit or a key shaft, or both of them, by means of a prime mover acting upon them through a friction connection; the mode of operation being substantially as specified, and doing away with sudden jars and increasing rapidity of operation, when contrasted with a positive connection between such parts and prime mover, and also permitting the two to move with varying velocities.

Seventh, I claim actuating or driving a key shaft and a revolving portion of a circuit, or either of them, by means of a friction connection with a prime mover, when the velocity of such prime mover is controlled by a governor, or some equivalent for the purpose, which either prevents its moving too fast or increases its velocity when going too slow, or performs both these duties, substantially under the mode of operation described.

Eighth, I claim governing or controlling the motions of a prime mover, which actuates a printing apparatus by the breaking and closing of an electric or galvanic circuit, so that such apparatus is put in operation both by the breaking of a circuit and by the closing thereof, substantially in the manner specified; and also the controlling of a printing apparatus so that it shall be permitted to print when a spring returns to its normal position at the time that a circuit is broken; the mode of operation being substantially such as set forth.

Ninth, I claim, in a printing telegraph, moving the paper to the types to produce an impression on the former, substantially in the manner described, as distinguished from former modes of operation by which the types were moved towards the paper.

Tenth, I claim, in combination, a revolving type wheel and a roller, or its equivalent, charged with coloring matter, so as to deposit such matter on the types as they, in succession, come in contact with the roller; the combination being substantially such as set forth; and this I claim, also, when the roller is grooved, as described.

Eleventh, Being aware of the facts that type wheels have been permitted to revolve, step by step, when controlled by escapements, and when such escapements have been actuated either by a prime mover governed by a pendulum or by electric-magnetic force, I claim actuating an escapement which controls the motions of a type wheel by a prime mover, whose motions are regulated by the breaking and closing of a circuit, under a mode of operation substatially such as described, whereby a small force, derivable from magnetism, controls any necessary power of a prime mover; there being a breaking and a closing of circuit correspondent with each vibration of the escapement.

Twelfth, I claim a hydraulic regulator, substantially such as described and for the purposes set forth.

Thirteenth, I claim a hydraulic regulator, in combination with

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type wheel and a printing apparatus and a prime mover; the combination being substantially as specified, and causing the press to print when the type wheel ceases to move for a longer time than usual.

Fourteenth, In combination with a type wheel and a printing press or apparatus, I claim apparatus, substantially such as specified, for making an alarm when that apparatus is permitted or caused to act by the breaking and closing of the same circuit of conductors, which, by its breaking and closing, permits the printing apparatus to come into action.

Eliza Wells, of New York City (administratrix of H. A. Wells, of New York aforesaid, deceased), for an Improvement in Machinery for Making Hat-bodies. Patented April 25, 1846; re-issued Sept. 30, 1856:

I claim forming hats of fur fibers by throwing the fur, in properly regulated quantities, substantially as described, against a section of the circumference of a perforated cone, or other form, as the same is rotated, to present, in succession, every part of the circumference thereof to the current of impelled fur to obtain the required thickness of bat, substantially as described, in combination with the method of holding the fibers on to the cone or other form during the operation, substantially as described and for the purposes specified.

Eliza Wells, of New York City (administratrix of H. A. Wells, of New York aforesaid, deceased), for Improvements in Manufacturing Hat-bodies. Patented April 25, 1846; re-issued Oct. 7, 1856:

I claim the forming of the hat fibers on a perforated cone or other form, in manner substantially as described, in combination with the hardening of such hat, while on such cone or other form, to give it the required consistency to admit of taking it off in a suitable condition for sizing by the well-known process of felting, substantially as described.

DESIGNS.

Isaac De Zouche, of St. Louis, Mo., for a Design for Parlor Stoves.

Jeremiah Meyer, of New York City, assignor to Alden Sampson, of Manchester, Maine, for a Design for Floor Cloth.

N. S. Vedder, of Troy, N. Y., assignor to S. S. Jewett and F. H. Root, of Buffalo, N. Y., for a Design for Stoves.

J. B. Virolet (assignor to J. W. Hoyt), of New York City, for a Design for Floor Oil Cloth.

W. L. Gilroy, of Philadelphia, Pa., for a Design for Paint Cans (three cases).

W. L. Gilroy, of Philadelphia, Pa., for a Design for Paint Vessels.

Notes & Queries.

CORRESPONDENTS sending communications for publication in our columns are requested to avoid writing on both sides of a sheet of paper. This fault, though common to persons unaccustomed to writing for the press, gives great trouble to the printer (especially in long articles), and, when combined with illegibility of handwriting, often causes interesting contributions to be regretfully consigned to our waste-paper basket.

F. L., of Mass.—Upon the subject of fire-escape ladders, we advise you to put yourself in direct correspondence with the parties you name.

L. L. S., of Mich.—Glass is "frosted" and etched by hydro-fluoric acid. It must be used in a very diluted state, and great care exercised to prevent it falling upon the hands, as it causes very malignant ulcers to form by touching the skin. Linseed oil is rendered quick-drying by boiling, and adding, slowly, some sulphate of zinc—about an ounce to the quart—after which it forms a good zinc-dryer.

H. & B., of Pa.—The "buoyancy of an elastic vapor under water" cannot be patented as a principle of motive power, because it is a well-known philosophical principle. You may, however, secure a patent for the mechanism by which it is applied as a motive agent, if it is new and useful.

H. W. K., of Mass.—A cement for attaching metal to glass is made as follows:—Take 2 ounces of a thick solution of glue and mix it with 1 ounce of linseed oil varnish, and ½ ounce of pure turpentine; the whole are then boiled together in a close vessel. The two bodies should be clamped and held together for about two days after they are united, to allow the cement to become dry. The clamps may then be removed.

R. W., of N. Y.—The best way to harden steel dies is to carry the water from a tank, or some hight where it will have a fall of about 40 feet, and allow it to fall in the very center of the die, which should be slightly inclined, and heated to a red heat; no higher. The water must be conducted through a tube to strike the die forcibly. This method hardens the whole face of the die uniformly.

G. W. G., of Texas.—Any mechanic can "rig-up" a screw propeller to be operated by hand in a boat by a person sitting at the bow. All that is required for this purpose is to extend the shaft of the propeller to the bow, and secure a crank upon it for the hand of the operator. He may also use a sub-shaft, with a gearing, to give the propeller any desired speed.

E. B. H., of Vt.—Shingles steeped in a solution of the sulphate of copper, and then thoroughly dried, will last much longer than those not so prepared. We do not advise you to use the liquid hot, although it will do no harm if it is about milk warm. The shingles should be green when thus treated. Copperas is not so good as the sulphate of copper for preserving timber.

G. F., of Conn.—Picric acid is made by dissolving indigo in strong nitric acid. You can obtain both indigo and nitric acid of Partridge & Sons, Cliff-street, this city. You will find a description of the preparation of it in almost every recent work on dyeing. This acid is an excellent test for potash in any liquid; a solution of it in alcohol produces a bright yellow.

D. D. N., of ——.—In very many localities the compass needle is subject to local attractions which cause it to vary. It would require volumes to print all that has been observed in regard to the mysterious motions of that little sliver of steel; but you will find all that you need in any good work on surveying. Lead pipes for pumps are of pure lead, the same as shot.

B. M., of Va.—Ammonia has a very limited action upon metallic copper, but the nitrate of copper and ammonia combine together; and thus you may obtain an ammoniate of copper suitable for your purpose.

T. P. K., of Ga.—Take two drachms of nitrate of silver and dissolve it in three ounces of soft water; then add ammonia, slowly, until the fluid becomes clear. When the ammonia is first added, a curdy precipitate is formed; but, by the addition of a greater quantity, the precipitate is dissolved, and the fluid becomes clear indeliable ink. It should be kept in a blue bottle for use. Fifty grains of nitrate of silver, dissolved in an ounce of soft water, containing a little gum arabic in solution, makes a very good indelible ink.

A. H., of Mass.—A "dead black" varnish for optical brass tubes may be made with fine ivory black, made into the proper consistency with turpentine in which a little wax has been dissolved. Another varnish—and the most commonly used—consists of 3 lbs. black sealing wax and 1 lb. of shellac, dissolved in 1 gallon of alcohol. This is afterwards mixed with fine lampblack. It is the lampblack which deadens the luster, and if you mix a certain quantity of it with any common varnish, it will answer perfectly for blacking the interior of telescopes.

PROFESSOR W. C. H., of Tenn.—We are not aware that the British, American, or any other government, proposes to pay anything for a so-called "perpetual motion." If you expect to get anything out of it, you must put it into practical use. The idea of a wheel with hollow conical spokes, to contain mercury, has been tried long ago; but, like all other ideas of perpetual motion, it has failed. If you place your wheel in such a position that the spokes are at angles of 45°, you will perceive that the whole device is in equilibrium, and it will therefore not move by its own accord; and if you turn the wheel a little further, the weight of the mercury is against you.

J. K. P., of N. Y.—To make superphosphate of lime, dilute sulphuric acid with twice its weight of water, and add bones broken into small pieces. The dilute sulphuric acid will dissolve them in a few days, after which the superphosphate should be mixed up with mold and applied to the soil. Large stoneware vessels, similar to those employed by gold-refiners for their acids, are the best to use for dissolving the bones. By adding more water to the sulphuric acid, the bones will take longer to dissolve, but the same results will be ultimately secured. The vessels should only be half filled with the acid and water.

D. C. McN., of C. W.—There is no composition nor instrument which is of the least use to enable you to discover gold and silver in the earth. The traditions which prevail in your neighborhood, about the Indians having a secret knowledge of silver in some of the rocks, is all nonsense, in our opinion. Such stories prevail in a great many places, and are generally believed by the ignorant and superstitious—no others. No lights are to be seen at night over rocks containing silver, any more than over potato patches.

J. L. G., of S. C.—Your proposed method of producing ice is somewhat novel; but we do not think you are able to freeze water in your large vessel by the arrangement, nor can we understand why you should use chemical absorbants of moisture, such as sulphuric acid, by which considerable heat, not cold, is produced. We advise you to make experiments, in order to satisfy yourself regarding the correctness of your opinions. As yet, we have seen no machine or method that was capable of manufacturing ice economically for our Southern cities. A somewhat inviting field lies in this direction for inventors.

T. E., of N. Y.—The bore of the Whitworth gun is hexagonal, and cut by machinery, we believe; but we have seen no description of the mechanism employed for the operation. Mr. Whitworth is allowed to be the best tool manufacturer in Great Britain.

T. S. B., of Ill.—The gloss on linen, such as shirt collars, is produced by the friction of the iron, upon the same principle of operation that muslin is glazed by calender rollers. The table or board upon which the linen is placed to be ironed must be smooth and hard, and for this purpose it should be covered with pasteboard. It is not necessary to add gum arabic to the starch, if the latter is made sufficiently strong, and thoroughly "possed" into the pores of the linen.

SIT LUX. of ——.—The tails of comets are a perfect mystery to the most eminent astronomers. Sir John Herschell says that a "negative shadow, if such a thing could be conceived of, would best explain all the phenomena." They do generally point from the sun, as well when the comet is receding as when it is approaching the sun. It is certain that the appearance of a tail does not result from the same cause as the luminous ring which is seen when we whirl a burning coal in the air; the latter being produced merely by the impression on the retina of the eye remaining for a moment.

L. S., of Ohio.—As you say, the motions of the atmosphere and their causes are very imperfectly understood. If you will give us a detailed account of the observations by which you have made your numerous discoveries in meteorology, we shall be much pleased to publish it. How do you know, for instance, that magnetism is caused by the electricity that collects about the Pole?

B. L., of Mass.—Your opinions regarding the cause of the whirling motion in water passing through an orifice in the bottom of a vessel, do not contravene those we have heretofore inculcated. So for as they go, your views are correct.

O. H. R., of Minn.—You can make common soft soap with potash by grease; and hard soap with soda lye and grease. You can make hard soap from common potash lye, by adding salt when the soap is nearly formed. Lye of a strength that will float an egg will answer very well for making soft soap. In making hard soap, the boiling is continued for several days, and strong caustic lye is added from time to time, as the water is evaporated, until saponification is effected. It requires experience to tell when this result is secured.

H. C. F., of Mich.—The enamel on iron articles is formed by cleaning the surface, putting on a composition of ground feldspar, quartz and borax, which is afterwards fused in a furnace. Black copal varnish may answer as a coating for your cast iron articles that are exposed to water. This varnish must be made with linseed oil and asphaltum.

MONEY RECEIVED

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, April 28, 1860:—

H. K., of N. Y., $55; W. D. G., of N. J., $30; T. M., of N. Y., $25; T. D., of Conn., $30; W. C. A., of Mo., $25; U. B. V., of Pa., $25; J. S., of Ind., $25; J. W., of N. Y., $20; L. B. D., of R. I., $30; T. C. H., of N. Y., $30; H. & H., of N. C., $25; W. Y., of Ind., $15; F. L. L., of Mich., $30; R. P. Van H., of Ohio, $25; H. & W., of Ohio, $15; J. M., of Mass., $20; E. N. F., of N. Y., $55; L. H., of Conn., $20; G. M., of Ohio, $30; W. G. S., of Ga., $30; N. D., of N. J., $25: G. E. F., of N. Y., $58; C. B. M., of Ill., $12; N. W. C., of N. J., $20; E. W., of Conn., $30; C. C. L., of Pa., $25; T. J. M., of Pa., $15; L. & W., of Ind., $25; R. N., of N. Y., $40; A. M. C., of N. Y., $30; J. M., of Iowa, $35; H. G. N., of N. Y., $30; J. H. of Pa., $30; G. & B., of Ind., $25; T. H. W., of Mass., $33; T. Y., of Iowa, $25; W. H. A., of N. Y., $60; R. L. U., of N. Y., $25; C. F. M., of Maine, $15; K. & H., of N. Y., $30; J. & C., of La., $30; J. B., of N. Y. $25; H. M., of N. Y., $25; J. C. P., of Maine, $45; F. A. G., of Ill., $30; H. R., of Mass., $225; G. W. R. B., of La., $350; F. & H., of La., $30; J. M. C., of S. C., $15; H. E. W., of N. Y., $30; C. J. H., of N. Y., $30; E. W. B., of N. J., $30; H. C. G., of Ill., $30; J. R. & Co., of Pa., $55; N. W., of N. Y., $15; E. L. G., of Conn., $25; H. W. N., of Ala., $30; E. G., of Mo., $30; W. F. J., of Ala., $45; W. H. P., of Wis., $30; M. Q., of N. Y., $40; A. B., of N. Y., $25; J. S., of N. Y., $25; G. W. S., of Conn., $55; P. & H., of N. Y., $130; S. F. B., of Mass., $30; M. M., of N. Y., $40; W. G., of Ala., $35; C. H., of La., $20; J. P. F., of N. Y., $30; C. W. S., of Iowa, $30; S. K., of Ohio, $30; D. F. S., of Mass., $25; J. S., of Maine, $43; W. McC., of N. Y., $25; J. M. C., of S. C., $25; H. Mg. Co., of Conn., $250; J. S., of Ill., $30; G. A. N., of N. Y.; $250; G. & A.. of La., $45; P. E., of Kansas, $30; G. H. C., of Maine, $30; L. B., of Ill., $30; T. E., of R. I., $20; J. W. T., of Ala., $10; J. A., of N. Y., $25; S. D. & B., of Ill., $30.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, April 28, 1860:—

C. B. M., of Ill.; J. B., of N. Y.; A. J. M., of Pa.; J. B. J., of Maine; H. E. W., of N. Y.; W. C. A., of Mo.; R. P. Van H., of Ohio; H. W., of N. Y.; R. L. U., of N. Y., W. F. & W. R. J., of Ala.; L. H., of Conn.; G. E. F., of N. Y.; P. & H., of N. Y. (two cases); M. Q., of N. Y.; A. B., of N. Y.; H. G. & D., of N. Y.; T. M., of N. Y.; L. & W., of Ind.; E. L. G., of Conn.; H. L. N., of N. Y.; C. F. M., of Maine; H. & W., of Ohio; V. & S., of Wis.; J. C. P., of Maine; A. D., of N. J.; J. M. C., of S. C.; C. C. L., of Pa.; C. H., of La.; J. S., of Ind.; G. & B., of Ind.; H. M., of N. Y.; W. F. J., of Ala.; J. S., of N. Y.; T. H. W., of Mass.; G. W. S., of Conn.; M. M., of N. Y.; D. F. S., of Mass.; J. M., of Iowa; U. B. V., of Pa.; J. P. F., of N. Y.; H. & H., of N. C.; W. Y., of Ind.; X. K., of N. Y.; J. & D., of Ala.; J. A., of N. Y.; G. & A., of La.; J. W. T., of Ala.; J. M. C., of S. C.; L. B., of Ill.; J. T. P., of Ind.

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IMPORTANT TO INVENTORS.

THE GREAT AMERICAN AND FOREIGN PATENT AGENCY.—Messrs. MUNN & CO., Proprietors of the SCIENTIFIC AMERICAN, are happy to announce the engagement of HON. JUDGE MASON, formerly Commissioner of Patents, as associate counsel with them in the prosecution of their extensive patent business. This connection renders their facilities still more ample than they have ever previously been for procuring Letters Patent, and attending to the various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court, Interferences, Opinions relative to Infringements, &c., &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings, extending over a period of fourteen years, has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

Consultation may be had with the firm, between NINE and FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, NEW YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH-STREETS, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Office, are cordially invited to call at their office.

They are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business they have Offices at Nos. 66 Chancery Lane, London; 29 Boulevard St. Martin, Paris, and 26 Rue des Eperonniers, Brussels. We think we may safely say that three-fourths of all the European Patents secured to American citizens are procured through our Agency.

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A pamphlet of information concerning the proper course to be pursued in obtaining Patents through their Agency, the requirements of the Patent Office, &c., may be had gratis upon application at the Principal Office or either of the Branches. They also furnish a Circular of information about Foreign Patents.

Communications and remittances should be addressed to

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CHEMICAL COMPOUND — FOR PROTECTING steam boilers from scale or oxydation, or other impure matter from adhering to the inside surface. It is warranted to clean them perfectly, and keep them so. Manufactured by CHESTER, CLARK & CO., FELIX CAMPBELL, Agent, No. 79 John-street, New York. Agents—Wm. Weed, Front-street, above Market; Morgan & Orr, Callowhill, near Twelfth-street; Hunsworth, Eakin & Co., Peoples' Works, Philadelphia, Pa.; Ashcroft & Co., No. 50 John-street, New York. Refer to Lee & Larned, Novelty Works, Wm. Clawsen, New York "Times," Chas. T. & I. N. Chester, Ab. B. Taylor & Co., R. H. Hoe & Co., James Beebe & Co., New York; Hooper & Townsend, Stewart & Peterson, Bringhurst & Verree, Philadelphia, Pa., and others. 19 1*

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A MESSIEURS LES INVENTEURS—AVIS IMportant.—Les inventeurs non familiers avec la langue Anglaise, et qui prefereraient nous communiquer leurs inventions en Francais, peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront recues en confidence.

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DOUGLAS'S WATER ESCAPE VALVE.

It is well known to all engineers that in high-pressure engines the steam is apt to condense in the cylinder, whenever the engine is stopped for a time, and before the engine is started it is necessary to draw off this water, cocks being inserted in the ends of the cylinder for this purpose. In case this precaution should be neglected by the engineer, there is danger of the cylinder, piston, or connections being broken. To guard against this contin gency, and to save the trouble of the engineer in attending to the matter, the self-operating valve represented in the annexed cuts has been invented.

Fig. 1

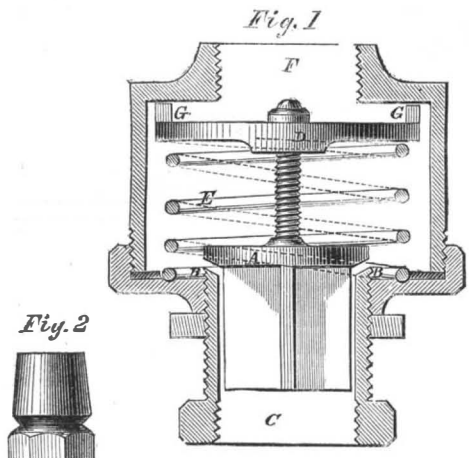


Fig. 2

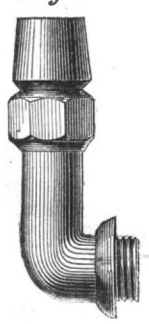
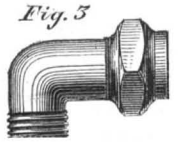


Fig. 3



It consists of the puppet valve, A, fitted to its seat, B B, so as to close the passage, C. To the stem of the valve is attached the plate, D, which is pressed upward by the spiral spring, E, thus lifting the valve from its seat, and opening the passage through the pipe, C. The valve box is screwed to the bottom of the engine cylinder, or otherwise arranged so that the passage, F, may communicate with the interior of the cylinder at its ends, and the spring is adjusted to hold the valve open during the period of the exhaust, but to yield to the full pressure of the steam, and allow the valve to be closed while the steam is flowing into the cylinder. The plate, D, is provided with projections, G, G, to prevent it from closing the passage, F, which projections may be secured either to the plate or to the upper side of the valve box. When the live steam enters the cylinder, it acts at once on the plate, D, thus closing the valve, A, much sooner than it would be closed by the action of the steam upon itself, and preventing any escape of steam before the valve is closed.

In order to facilitate the adjustment of the pressure of the spring, the valve, B B, is made upon the end of a separate pipe, which may be screwed a greater or less distance into the valve box. This automatic valve, besides its principal office, acts also as a supplementary exhaust, and thus diminishes the back pressure of the steam.

The patent for this invention was obtained by Frank Douglas, through the Scientific American Patent Agency, April 3, 1860, and further information in relation to it may be obtained by addressing Douglas, Rogers & Co., Norwich, Conn.

McNEIL'S HOT-AIR MOISTENING REGISTER.

Of all the agencies which the grim King of Terrors has marshalled to his service—War, Famine, Fever, Plague, Cholera, Rum—the great leader in the harvest of Death is *Dry Air*. This withering power spreads its blasting breath into our very vitals, and drys up the fountains of life. The atmospheric air, to which our lungs are adapted by the wise Intelligence who made them, is composed by volume of 20.55 per cent of oxygen, 78.16 of nitrogen, a small fraction of carbonic acid, and from 1-10th to 4 per cent. of aqueous vapor. It is one of the many wonderful facts in nature that so small a quantity of the vapor of water should exert so powerful an influence as it does upon the animal economy. But when we consider the composition of our bodies, in connection with a peculiar property of air, this fact ceases to excite our wonder. The human system consists of a collection of pipes, conduits and sacs, all constructed for the purpose either of conveying or containing some fluid. The principal portion of these fluids—and, indeed, of our whole system—is water. As this water, in evaporation and other ways, is constantly passing off, unless the supply is renewed the fluids become thickened, the several organs are unable to perform their functions, and the destruction of the system ensues. The supply of water to the system being of this vital imtance, we are, by a wise provision of nature, most powerfully impelled to procure it—that is, by the suffering of thirst. The intensity of this suffering is generally proportioned to the necessity of the supply; being so great before the actual destruction of the system as to drive us to frantic exertions, and to frequently produce absolute delirium. Not a single organ of the body will perform its functions when deprived of its moisture; but the lungs, being more subject to fatal diseases than the other organs, it is of more pressing importance that they should not be robbed of any part of the substance which is essential to their healthful operation.

Now, the relation of atmospheric air to heat and moisture is such, that the warmer the air is, the more moisture will it contain. If air, at any temperature, is brought in contact with water, it will absorb as much of the water as it, *at that temperature*, can hold; and if this air is then cooled, it will deposit a portion of the water, while, if it is heated, it will absorb a still larger quantity. The following table shows the number of grains, ascertained by careful experiments, that a cubic foot of air will contain at various temperatures from zero to 100°:—

Degrees.	Grains.	Degrees.	Grains.
0	0.545	60	5.756
10	0.841	70	7.992
20	1.298	80	10.949
30	1.969	90	14.810
40	2.862	100	19,790
50	4.089		

If we take winter air which has had the water squeezed out of it by the cold, and warm it in a furnace, its capacity for moisture is enormously increased, and it rapidly absorbs all water with which it comes in contact. In its passage through the trachea, bronchial tubes and air cells of the lungs, it dries up these vital organs, leaving bronchitis and consumption in its withering track.

Fig. 1

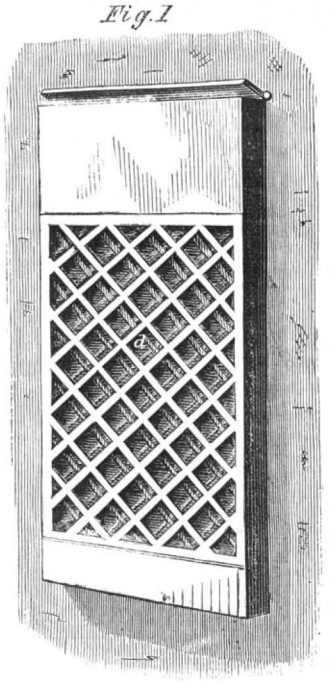
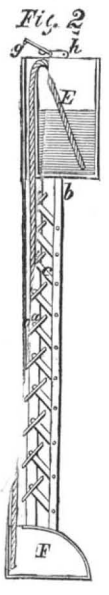


Fig. 2



Hence the necessity, under the penal of death—a penalty from which no legal cunning an no humane jury can save us—of making *ample* provi n for moistening air which is heated by stoves or fur ces. The pans of water usually provided are wholly inadequate for the purpose; and it is with sincere s faction that we see our inventors taking hold of this measurably important matter.

The annexed engraving illus tes a contrivance for attaching a coarse web of slac -twisted cotton to a furnace register, the web to always kept moist by means of capillary attraction. he slats, *a a a*, of the register are opened and closed the usual manner, by raising or lowering the rod, which is connected by pivots with the arms, *c*, whi are rigidly fastened upon the slats. In front of the slats of the register is the open, sieve-like web of cotton, *d*, the upper end of which is bent over, and drops into a tank of water, E, while the lower end rests in the tank of water, F. A cover, *g*, of the register is connected by an arm, *h*, with the rod, *b*, so that when the rod is raised, and the register closed, the cover is also closed. A projection extends the whole length of this cover upon its lower side; so that when the cover is closed this projection rests upon the cotton web, where the latter bends over its upper support, and thus arrests the capillary flow of the water from the tank along the web.

This attachment is perfectly neat—indeed, it may be ornamental—and it must add very materially to the moisture of the air; thus operating to mitigate the unhealthfulness of furnaces.

The patent for this invention was issued on March 13, 1860, to Thomas E. McNeil, of Philadelphia, Pa. Persons desiring further information may address S. A. Heath & Co., No. 37 Park-row, New York.

LOCOMOTIVES IN CITIES.—The Superior Court, sitting at Cincinnati on the 3d ult., determined the case of Mr. Robert Hosena and others against the Mississippi Railroad Company and others. The defendants obtained permission from the City Council to lay down a track in Front-street, connecting the depots of the Ohio and Mississippi and Little Miami railroads. The plaintiffs, being property-holders on that street, applied for an injunction, on the ground that the proposed track would interrupt travel on the street, and thereby prove injurious to their property. The prayer of the petitioners was granted, the Court holding that the City Council had no right to authorize the use of the streets to the interruption of business or to the injury of property

THE FIRE-ESCAPE FOR THIS CITY.—At a meeting of the Common Council of this city, held on the 26th ult., a resolution was adopted to appropriate $15,000 for purchasing the patent right of Mickle & Carville's fire-escape, which was illustrated on page 260 of the present volume of the SCIENTIFIC AMERICAN.

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